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R. H. SECHRIST

3,017,199

WHEELCHAIR STEERING ARRANGEMENT

Filed Jan. 21, 1959

2 Sheets-Sheet 1

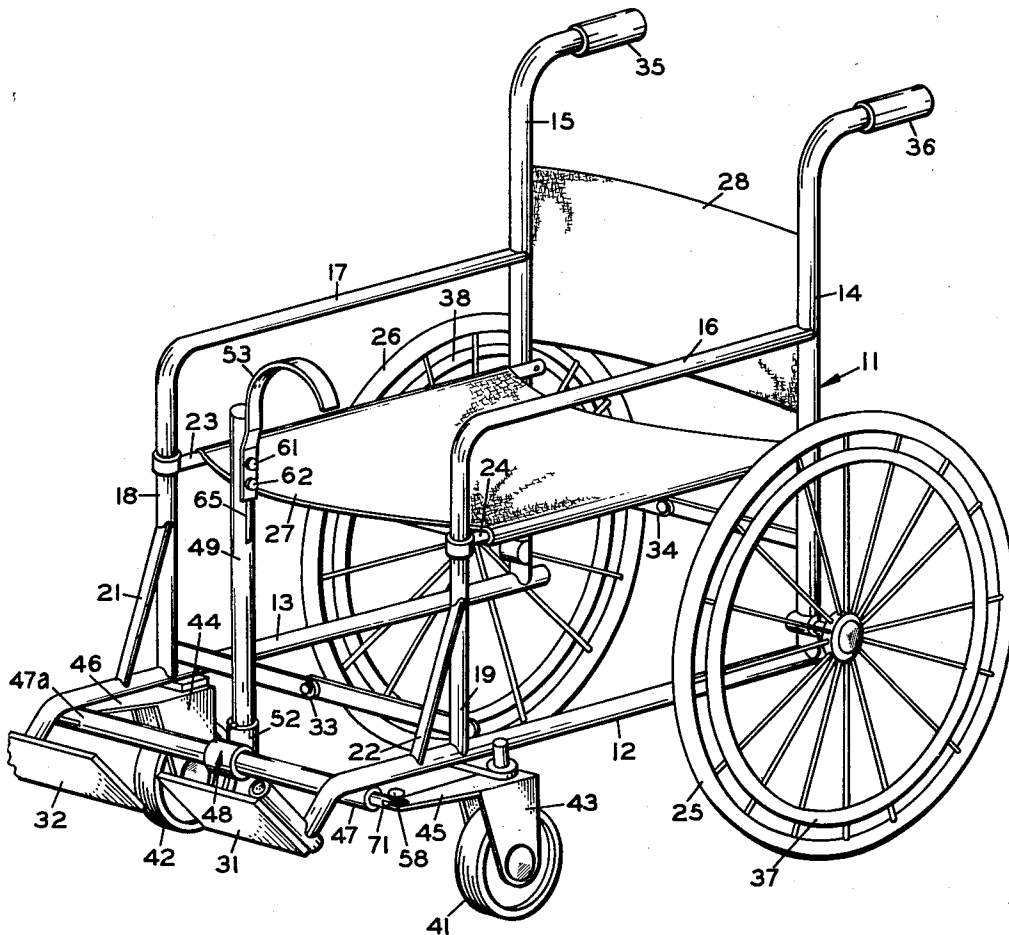


FIG. 1

INVENTOR.
ROY H. SECHRIST

BY

Jerome R. Cox
ATTORNEY

Jan. 16, 1962

R. H. SECHRIST

3,017,199

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2 Sheets-Sheet 2

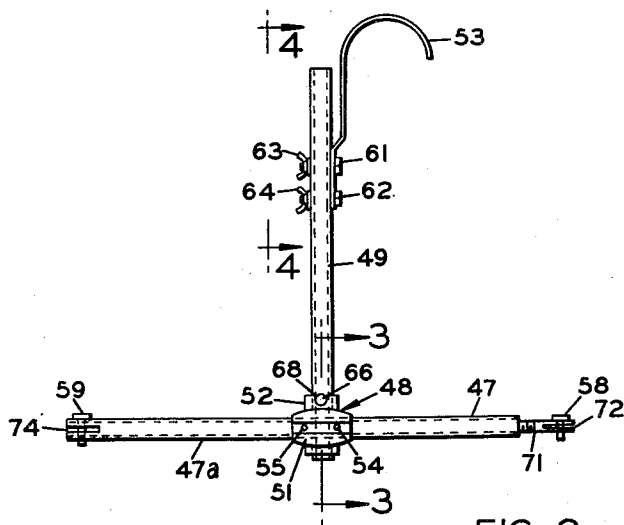


FIG. 2

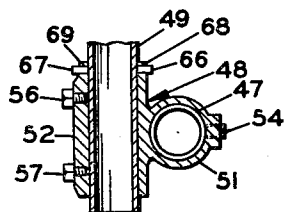


FIG. 3

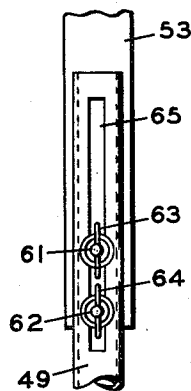


FIG. 4

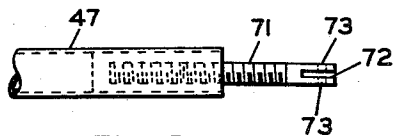


FIG. 5

INVENTOR.
ROY H. SECHRIST

BY

Jerome R. Cox
ATTORNEY

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3,017,199

WHEELCHAIR STEERING ARRANGEMENT

Roy H. Sechrist, 300 Forest Lawn Blvd., Marion, Ohio

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1 Claim. (Cl. 280—269)

The invention disclosed and claimed in this application relates to wheelchairs such as those used by invalids and crippled persons, and especially to steering devices for such wheelchairs.

Wheelchairs are ordinarily constructed for propulsion by an attendant who pushes such chairs by means of handles and for operation by the occupant of the wheelchair. Where the occupant of the wheelchair operates the propulsion thereof himself, he usually does so either by crank arms which are connected to the two traction wheels of the chair and are separately operated by the two hands of the occupant, or by hand rims which are attached to the traction wheels of the chair and one of which is operated by one hand and the other by the other hand of the occupant. It frequently happens that a person who is incapacitated and unable to walk also may have lost the use of one arm or one hand. Frequently paralytic patients have lost the entire use of one side and are unable to use either the hand or the foot on that side. Double or triple amputees often have lost the use of one of the hands or arms.

If an invalid or incapacitated person has the use of only one hand, he can, by operating the hand rim or crank arm of the wheelchair on the side of the usable hand, cause that traction wheel to turn. However, it is very difficult and in some cases impossible, to cause a chair to go in a straight line by the use of one wheel only. It is impossible, or very nearly so, to steer in any appreciable or satisfactory sense inasmuch as operation of the one wheel usually causes the chair to go in a circle. The problem involved is thus difficult.

Several attempts have been made to solve this problem. In one such attempt, double hand rims are placed on one side of the wheelchair and are arranged to be operated by one hand of the occupant. In such case, obviously one hand rim is attached directly to the traction wheel associated therewith, but the other must be connected by a solid axle running across the width of the chair and connected to the other traction wheel. In such case, not only is it impossible to fold a chair having such arrangement, but it also is inconvenient to adapt the chair quickly for invalids having the use of the hand opposite to that for which the chair is at present arranged. And more important, it is awkward or difficult for an invalid to operate with one hand the two rims separately for steering such chair.

Objects

An object of the present invention is to provide a wheelchair which may be driven through one of the drive wheels in combination with means associated therewith for steering the chair.

Another object of the invention lies in the provision of an invalid's chair which may be driven by an invalid having the use of only one hand or arm, but which is nevertheless collapsible in storage and thus will take up a relatively small area when stored.

A further object of the invention is the provision of an invalid's wheelchair in which provision is made for means for steering and propelling the chair whereby an invalid incapacitated by the loss of either one hand or arm can readily propel and guide the chair.

Another object of the invention is to provide an invalid's wheelchair having a drive for driving one of the drive wheels or main traction wheels of the chair by means of one hand, and having means operable by a leg of the occupant for steering the chair.

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A further object of the invention includes the provision of attachments to be added to the invalid's wheelchair of usual design for the purpose of converting the chair into one which may be readily steered by an invalid who has lost the use of one of his arms or hands.

A further object of the invention lies in the provision of an invalid's chair which is very efficient and easily converted for use or storage and which by reason of its simple construction is inexpensive to manufacture.

Further objects and features of the invention will be apparent from the following specification and claim when considered in connection with the accompanying drawings illustrating an embodiment of my invention.

In the drawings:

FIG. 1 is a view in perspective of a wheelchair constructed according to my invention;

FIG. 2 is a view in front elevation of attachments which may be added to a wheelchair of ordinary construction in order to convert it into a wheelchair especially adapted for use by an invalid having only one hand or arm;

FIG. 3 is a view in vertical section taken substantially on the line 3—3 of FIG. 2;

FIG. 4 is a view in side elevation taken substantially on the line 4—4 of FIG. 2; and

FIG. 5 is a view of a fragment of the horizontal cross bar on a slightly enlarged scale.

Referring still to the drawings for a detailed description of the embodiment of my invention illustrated, it may be seen that I have shown in FIG. 1 a wheelchair designated generally as 11, having a frame work consisting generally of the several frame members including lower horizontal members 12 and 13, rear upright members 14 and 15, upper horizontal members 16 and 17, downward continuations of said members 16 and 17, said continuations being designated 18 and 19, braces 21 and 22, and horizontal seat supporting members 23 and 24; wheels 25 and 26; a flexible seat 27; and a flexible back 28. At the forward end of horizontal members 12 and 13 there are provided footrests 31 and 32, between the members 18 and 19 there is provided a foldable brace 33, and between the members 14 and 15 there is provided a foldable brace 34. The members 14 and 15 are turned rearward at their upper ends; and handles 35 and 36 are attached at the rear thereof. Hand rims 37 and 38 are secured to the traction wheels 25 and 26. Castor type forward wheels 41 and 42 are pivotally mounted to the frame members 12 and 13 respectively.

I provide a novel attachment assembly for invalids' wheelchairs, the above described structure being an invalid's wheelchair of conventional design and shown in order that I may illustrate in connection therewith features of my invention which invention relates mainly to the attachment assembly and the combination thereof with a chair of conventional design. Said assembly consists of parts for steering said wheelchair by the use of the leg of the occupant of the chair. The castors 41 and 42 are provided with yoke supports 43 and 44 by which they are pivoted to the frame members 12 and 13 respectively. I provide forward extensions 45 and 46 for the yokes 43 and 44. I connect these two extensions 45 and 46 of the yoke members by a pair of connecting tubes 47 and 47a which extend horizontally across the front of the wheelchair. An integral fitting 48 secures the tubes 47 and 47a together. It also serves to secure the lower ends of a vertical tube 49 to the inner ends of the tubes 47 and 47a. The fitting 48 comprises as it were a pair of sleeves 51 and 52 set with their axes perpendicular to each other and although the fitting is preferably formed as shown in one piece as for example by casting it could be formed by two sleeves secured to each other. The fitting 48 is secured to the tubes 47 and 47a by means of set screws

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54 and 55 and the fitting 48 is secured to the upright tube 48 as later described. The screw 54 clamps the right hand tube 47 and the screw 55 clamps the left hand tube 47a. Adjustably secured to the upper end of tube 49 is a leg yoke 53 adapted to fit upon the upper part of the leg of the occupant of the wheelchair.

Referring to FIGS. 2 and 3, it may be more clearly seen that the tube 49 is secured to the tubes 47 and 47a by means of the fitting 48, the horizontal sleeve 51 of the fitting 48 being secured to the tube 47 by means of set screws 54 and 55, and the vertical tube 49 telescoped within the sleeve 52 as shown. It may if desired be secured by set screws such as the set screws 56 and 57. However, these screws are not necessary and may be omitted inasmuch as gravity and the lugs 66 and 67 hold it sufficiently securely without requiring the screws 56 and 57.

The horizontal tubes 47 and 47a are secured to the arms 45 and 46 by pins 58 and 59 respectively, said pins being shown best in FIG. 2. The leg yoke or brace 53 is adjustably secured (see FIGS. 2 and 4) to the upright tube 49 by means of the bolts 61 and 62 having thumb nuts 63 and 64 respectively. The bolts 61 and 62 extend through the holes in the yoke 53 and through longitudinal slot 65 formed in the tube 49. Spaced from the lower end of the tube 49 a distance slightly greater than the height of the sleeve 52 are a pair of projections or lugs 66 and 67 oppositely positioned and secured to said tube in any convenient manner. Practically, I prefer to form these lugs by driving a single long pin through the tube from one side so that the projecting ends of the pin form the two lugs 66 and 67. The sleeve 52 has a pair of slots such as the slots 68 and 69 formed opposite to each other to position the tube 49 correctly so that the yoke 53 is in correct position for operation by the left leg or right leg of the occupant of the chair.

The horizontal tubes 47 and 47a are constructed so that the combined length thereof can be adjusted to compensate for the different widths of wheelchairs. By loosening one or both of the screws 54 and 55, one or both of the tubes may be moved so that their inner ends are closer together or further apart thus changing the overall length of the horizontal member consisting of the tubes 47 and 47a. I also may provide additional means for adjusting the length to compensate for different widths of chairs. Thus in FIG. 5 I have shown tube 47 more clearly showing that it has one end threaded internally and has a threaded bolt 71 secured in said threaded bore, the bolt being formed with a slot 72 through which the forward end of the projection 45 extends and being formed with holes 73 through which bolt 58 extends to secure the horizontal tube 47 to the extension 45 of the castor 41—43. A slot 74 similar to slot 72 is formed in the opposite end of tube 47a for a similar purpose and holes similar to holes 73 are also formed in said opposite end.

Operation

The invention involved consists of a movable steering device for wheelchairs for use by patients who have the

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use of only one arm or hand. I add to a conventional wheelchair an upright tube 49 having secured to its upper end a fork or leg yoke 53. The tube 49 has a cross bar consisting of tubes 47 and 47a secured to it at its lower end. The cross bar consisting of said tubes 47 and 47a is attached to extensions 45 and 46 of the castors 41—43 and 42—44. The knee of the patient, or part of the leg just above the knee, is placed in the fork or yoke 53 and the leg is moved in the direction in which the patient wishes to turn. Note that this movement translates the yoke 53 and the tube 49 and the cross bar or tube 47 either left or right and does not pivot either about the axis of the tube 49 or the horizontal axis in the cross bar 47. This translation movement turns the castors 41—43 and 42—44 and thereby makes it easy to steer the wheelchair regardless of the turning moment occasioned by the use of only one of the driving wheels 25 and 26. The upper part of the tube 49 may be lifted out and turned around in the case the patient has only one leg which is on the opposite side to that of the yoke 53. The entire attachment (except for the extensions 45 and 46) may be easily removed by removing the pins 58 and 59 and the wheelchair may then be operated as an ordinary wheelchair or then be folded and stored as in the case of the usual foldable wheelchair. The screws 54 and 55 may be loosened, if desired, and the fitting turned forward or backward so as to adjust the position of the yoke 53 to accommodate it to the length of the leg of the occupant of the chair.

It is to be understood that the above described embodiments of my invention are for the purpose of illustration only and various changes may be made therein without departing from the spirit and scope of my invention.

I claim:

In combination a wheelchair having a pair of traction wheels and a pair of castor wheels, a forward extension secured to each of said castor wheels, a cross bar connecting the forward castor extensions and consisting of a tube and a screw threaded extension screwed into said tube whereby the length of the cross bar member may be effectively varied, an upwardly extending tube secured to an intermediate portion of said cross bar, and a leg yoke secured to the upper end of said vertical tube whereby the occupant of the wheelchair may steer the wheelchair by movement of his leg together with said yoke, said vertical tube, said cross bar, and said castors.

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