Nov. 26, 1957 G. L. KELLY 2,814,505

INVALID CHAIR DRIVE AND STEERING MECHANISM

Filed April 22, 1955

Fig. 1.

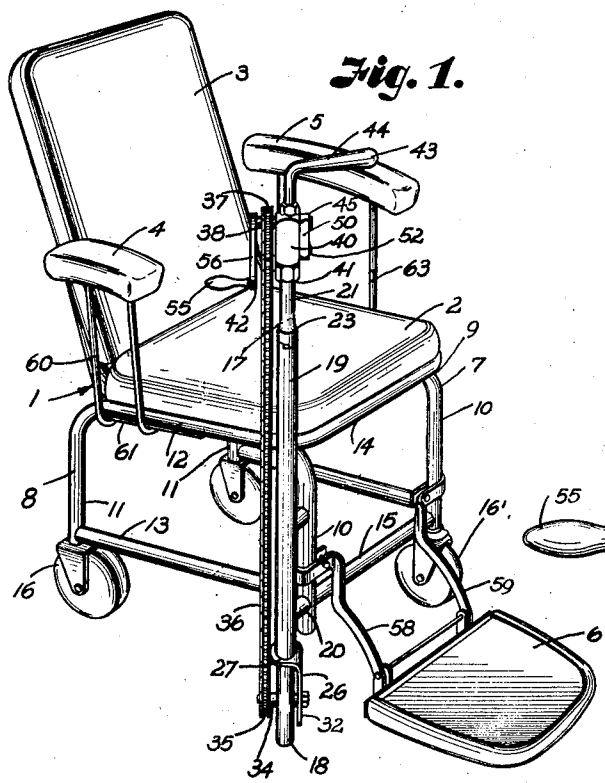


Fig. 2.

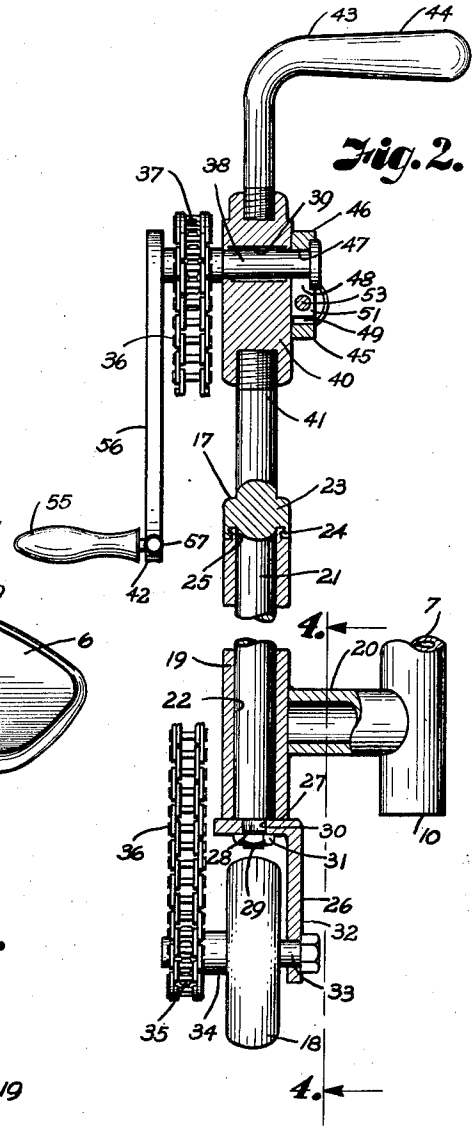


Fig. 3.

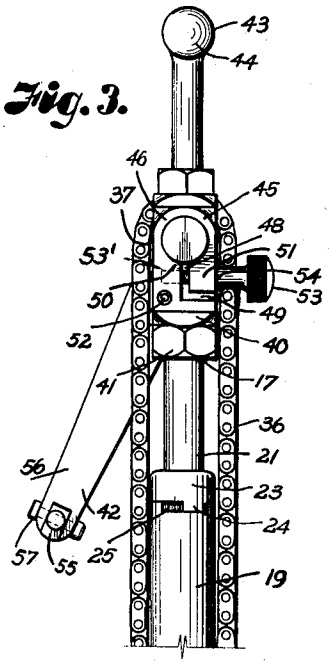
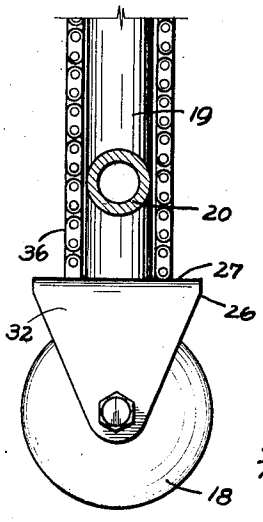


Fig. 4.



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INVALID CHAIR DRIVE AND STEERING MECHANISM

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3 Claims. (Cl. 280—250)

This invention relates to wheel chairs for invalids and the like, and more particularly to an improved chair and devices thereon enabling the invalid to propel and steer the chair and otherwise maneuver the parts thereof in helping themselves at least to a degree.

Persons who are bedridden, crippled or are invalids to an extent that they are more or less helpless, are generally spiritless and do not have a state of mind conducive to cheerfulness or hope because of the realization that they are a burden upon other people. When their every slight need requires the attention of others, it is a constant reminder to them of their own helplessness. When it is possible for them to help themselves to some extent, and thereby become more or less independent of others, there is a tendency towards a more cheerful, happy state of mind that in some cases aids improvement or recovery of the health of the invalid. Also, the ability of the invalid to help themselves naturally relieves others of a portion of the burden of attending them.

The objects of the present invention are to provide a wheel chair structure that may be readily manipulated by the invalid without the necessity of assistance by others; to provide such a chair with driving and steering mechanism capable of being easily handled by an invalid using one hand or both for moving the chair from place to place and yet when desired may be firmly located wherever the invalid desires to have the chair disposed in a stationary location; to provide an invalid chair structure that is relatively narrow whereby the invalid can easily maneuver same through doorways and around obstructions that would present difficulties in the movement of conventional invalid chairs; to provide an invalid's chair having various other features such as movable arm rests and foot rests that are easily operable or movable whereby they present no obstruction to the movement of the chair close to other objects or the invalid from getting on or off of the chair; to provide an invalid chair steering and driving mechanism adapted for either folding or rigid chair structures, and to provide an invalid chair structure that is sturdy and stable yet economical to manufacture and capable of long hours of comfortable, efficient use wherein the invalid may help themselves to a great degree.

In accomplishing these and other objects of the present invention, I have provided improved details of construction, the preferred forms of which are illustrated in the accompanying drawings, wherein:

Fig. 1 is a perspective view of a wheel chair embodying the features of the present invention.

Fig. 2 is a vertical sectional view through the driving and steering mechanism.

Fig. 3 is a side elevation of the upper portion of the driving and steering mechanism from the chair side thereof.

Fig. 4 is a vertical sectional view taken on the line 4—4, Fig. 2.

Referring more in detail to the drawings:

1 designates an invalid's chair embodying the features of the present invention including a seat 2, back 3, arm rests 4 and 5, and foot rest 6, and a wheeled carriage 7 upon which all of these various parts are supported. The wheeled carriage 7 includes side frame members 8 and 9, each of which has front and rear legs or posts 10 and 11, suitably connected by vertically spaced members 12 and 13 to provide rigidity in said side frame members. In the particular structure illustrated, the side frame members are connected by vertically spaced rigid bars 14 and 15 which hold the side frames in spaced relation; however, the side frames may be connected by suitable foldable braces or the like and the seat and back members made of flexible material whereby the chair may be collapsed as by folding the side frames together for facilitating transportation of the chair.

Suitable wheels 16 of the rigid or non-swivel type are mounted on the lower ends of leg 11 of side frame 8 and leg 11 of side frame 9. A swivel type caster wheel 16' is mounted at lower end of leg 10 of side frame 9. While the wheels 16 and 16' may be of any suitable size, it is found that in actual structures it is preferable to use wheels of from 5 to 8 inches in diameter for ease of operation and rolling over rug edges, bumps, rough ground, and the like.

A driving and steering mechanism 17 including a wheel 18 preferably substantially the same diameter as wheels 16 and 16' is suitably mounted on the chair adjacent to the leg 10 of the side frame 8 for cooperation with wheels 16 and 16' in providing a four-wheel support for the chair. The driving and steering mechanism 17 in the illustrated structure includes a vertically arranged tubular post 19 having suitable connector means 20 extending therefrom and secured to the leg 10 of the side frame 8. In the illustrated structure, the connectors 20 consist of tubular members welded or otherwise secured to the tubular post 19 and leg 10. It is to be understood that removable clamps or the like can be utilized for removably connecting the post 19 to the leg 10 or other suitable part of the side frame 8.

A shaft 21 is rotatably mounted in and extends through the bore 22 of the post 19, said shaft 21 having a collar 23 fixed thereon adjacent the upper end of the post 19, said collar having depending lugs 24 operable in elongated notches 25 in the upper end of the post 19 to limit rotative movement of the shaft 21 relative to the post 19. It is preferable that the lug and notch be such that the relative rotation of the shaft 21 and post 19 is limited to slightly more than 90° as it has been found that that is sufficient for normal turning of the chair; however, the rotation may be greater as long as the extent of rotation does not cause interference of the driving mechanism later described.

A wheel bracket 26 is removably mounted on the lower end of the shaft 21. The bracket is preferably L-shaped, with one portion 27 thereof suitably connected and keyed to the lower end of the shaft 21 and rotatably engaged with the lower end of the post 19. In the particular structure illustrated, the shaft has a polygonal-shaped extension 28 terminating in a threaded end 29, extending through the corresponding polygonal-shaped aperture 30 with a nut 31 threaded on the threaded extension 29 to secure the bracket 26 to the shaft 19. The other portion 32 of the bracket extends downwardly and has an axle member 33 mounted therein and extending therefrom in the same direction as the member 27 extends from the member 32.

The wheel 18 is rotatably mounted on the axle 33, substantially under the end of the shaft 21. The wheel 18 has a hub 34 on which is fixed a sprocket 35 operatively engaged with a flexible driving member such as a chain,

36; said chain also operates over a sprocket 37 fixed on a shaft 38 that is rotatably mounted in a bearing 39 carried in a block 40 secured to the upper end 41 of the shaft 21. A crank or other operable member 42 is fixed on the shaft 38 whereby rotation of the crank 42 rotates the sprocket 37 driving the chain 36 to rotate the sprocket 35 and wheel 18 to impart movement to the chair. A handle 43 has one end fixed to the block 40 and the other end 44 turned to extend in the opposite direction from the block 40 relative to the sprocket 37 whereby the handle portion 44 is in front of a person on the seat 2, and swinging movement of said handle portion will rotate the shaft 21 to turn the wheel 18 in steering the chair.

A brake structure 45 is arranged on the block 40 and acts on the shaft 38 to retard or prevent rotation thereof and thereby tend to hold the chair in selected position. The brake mechanism consists of a clamp member 46 having a bore 47 adjacent one end thereof for receiving the end of the shaft 38. A slot 48 extends from the bore 47 and terminates in a laterally extending slot 49 to define spaced legs 50 and 51. The leg 50 is secured to the block 40 by a suitable fastening device 52 and a screw 53 or the like is threaded into a threaded bore 53' in the leg 50 and has a shoulder 54 engaging the leg 51 whereby threading the screw into the threaded bore 53' draws the legs towards each other to tighten the clamp on the shaft 38 to retard rotation thereof. It is preferable that the crank 42 be provided with a handle 55 connected to the crank arm 56 by a hinged mounting 57 whereby the handle can be swung to a position substantially in line with the arm 56 to reduce the total width of the structure and thereby permit its passing through extremely narrow doors and the like.

The foot rest 6 is hingedly mounted on spaced arms 58 and 59 that are removably secured to the legs 10 of the side frames 8 and 9. The hinged arrangement of the mounting of the foot rest is such that the foot rest may be swung upwardly when desired. While a single foot rest is shown, separate foot rests may be utilized with individual mountings for each, particularly if the chair frame structure is such that it can be folded.

The arm rest 4 is supported on members 60, the lower ends of which are suitably secured relative to the member 12 of the side frame 8. In the particular structure illustrated, as for a non-foldable chair, a frame 61 is secured to the members 12 and the arm supports 60 are secured to one end of said frame 61. The other arm rest 5 is fixed on supports 63.

The arrangement of the wheels on the frame as shown and described is exemplary only as the swivel or caster wheel 16' may be on either the front or rear portion of the frame. Also the driving and steering mechanism 17 may be at either side and at the front or rear. While four wheels are shown, the driving and steering mechanism may be used with chairs having two other wheels making a three wheeled chair with any desired location of the driving and steering mechanism.

In using a chair structure such as described, with a person seated on the seat 2, normally, one hand is placed on the handle member 44 and the other on the crank handle 55. Then, by rotation of the crank, the wheel 18 is driven to move the chair and the handle 44 is swung to provide proper steering thereof. However, probably the most novel feature of the chair lies in the fact that it is easily operated by one hand, using handle 44 both for steering and locomotion. This leaves other hand free to carry, for example, a glass of water or a pot of coffee. A person disabled in one arm can also operate the described chair. When it is desired to hold the chair in any selected position, the screw 53 is turned to tighten the brake member on the shaft 38 to prevent rotation of said shaft, thereby locking the wheel 18 against rotation. While the driving and steering mechanism is shown on the righthand side of the chair, it is believed obvious it may be used on either side, and the retractable arm rest 5 arranged on the side opposite the steering and driving mechanism.

It is believed obvious that I have provided an invalid's chair that is capable of being made in small widths, yet provide comfort to the person therein, and also a driving and steering mechanism enabling persons to help themselves and move to various places as desired, thereby have a greater state of independence.

What I claim and desire to secure by Letters Patent is:

1. In an invalid's wheel chair having a frame with spaced legs at the forward and rearward portions thereof and a seat carried by said frame, wheels mounted on each of the rearmost legs and at least one of the front legs on the frame with one of said wheels mounted for castered movement, an upright hollow post, means securing said upright post to the frame in laterally spaced relation to the other of the front legs, an upright shaft rotatably supported in the post, a wheel rotatably mounted at the lower end of the shaft for cooperation with the other wheels for supporting the chair, means fixed to the upper portion of the shaft and extending radially therefrom toward the occupant of the seat whereby said occupant may operate the means to turn said shaft and wheel mounted on the lower end thereof whereby said wheel and the castered wheel cooperate to provide for steering of the chair, and means mounted adjacent the upper end of the shaft and operatively connected with the wheel at the lower end of said shaft for rotating said wheel to move the chair in the direction in which the wheel is turned.

2. In an invalid's wheel chair having a frame with spaced legs at the forward and rearward portions thereof and a seat carried by said frame, wheels mounted on each of the rearmost legs and at least one of the front legs on the frame with at least one of the wheels mounted for castered movement, an upright hollow post, means securing said post to the frame in laterally spaced relation to the other of the front legs, an upright shaft rotatably supported in the post and having an upright portion extending thereabove, a wheel rotatably mounted at the lower end of said upright shaft for cooperation with the other wheels for supporting the chair, means fixed to the upper portion of said upright shaft and extending radially therefrom toward the occupant of the seat whereby said occupant may operate the means to turn said shaft and wheel mounted on the lower end thereof whereby said wheel and the castered wheel cooperate to provide for steering of the chair, a second shaft carried by the first named shaft and rotatably mounted adjacent the upper portion thereof for rotation on an axis perpendicular to the first-named shaft, means for selectively rotating said second shaft, means operatively connecting the second shaft to the wheel at the lower end of the first-named shaft whereby rotation of the second shaft will rotate said wheel and move the chair in the direction the wheel is turned, a brake member supported on the upper portion of the first-named shaft and extending at least partially around the second-named shaft, and screw means engaged with the brake member and operative for effecting tight engagement between the brake member and second shaft for resisting rotation thereof whereby the operative connection between the second shaft and the wheel on the lower end of the first-named shaft cooperates to resist movement of the chair.

3. In an invalid's wheel chair having a frame with spaced legs at the forward and rearward portions thereof and a seat carried by said frame, wheels mounted on each of the rearmost legs and at least one of the front legs on the frame with at least one of said wheels mounted for castered movement, an upright hollow post, means securing said post to the frame in laterally spaced relation to the other of the front legs, an upright shaft rotatably supported in the post and having an upper portion extending thereabove, a wheel rotatably mounted at the lower end of said upright shaft for cooperation with the

other wheels for supporting the chair, means fixed to the upper portion of said upright shaft and extending radially therefrom toward the occupant of the seat whereby said occupant may operate the means to turn said shaft and wheel mounted on the lower end thereof whereby said wheel and the castered wheel cooperate to provide for steering of the chair, a second shaft carried by the first-named shaft and rotatably mounted adjacent the upper portion thereof for rotation on an axis perpendicular to the first-named shaft, means for selectively rotating said second shaft, and means operatively connecting the second shaft to the wheel at the lower end of the first-named shaft whereby rotation of the second shaft will rotate said wheel and move the chair in the direction the wheel is turned.

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