

[54] **MODULAR MOTORIZED WHEEL CHAIR**

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[58] **Field of Search** **180/6.5, DIG. 3; 297/DIG. 4, 300, 301, 416, 423, 429, 440, 443; 318/55, 58, 139**

[56]

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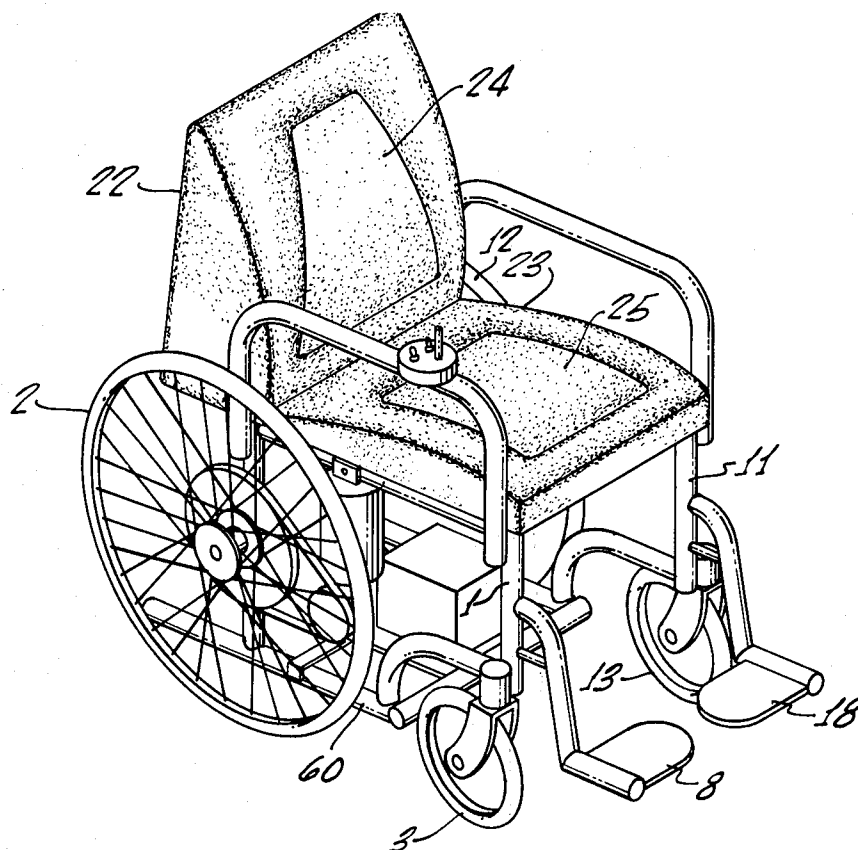
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[57]

ABSTRACT

The specification discloses a motorized wheelchair which can be quickly and easily disassembled into separate lightweight components. The separate components can be conveniently stacked to minimize space requirements when transporting the chair from one location to another.

3 Claims, 2 Drawing Figures



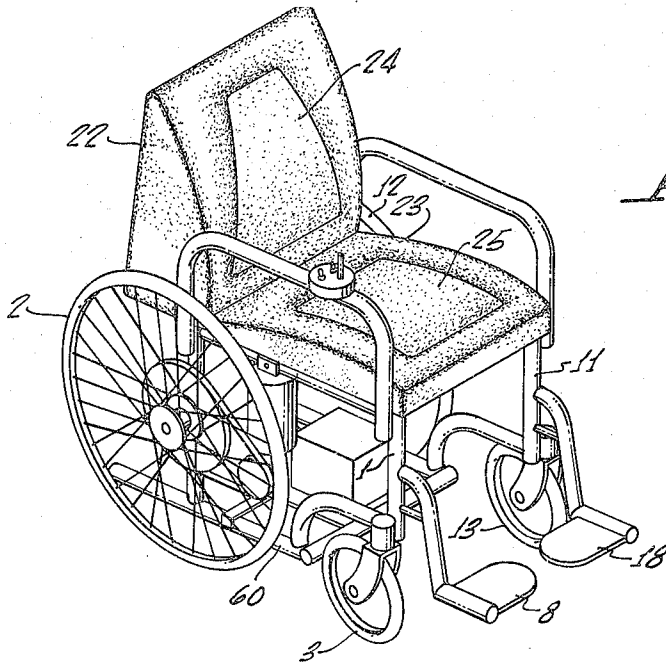


FIG. 1

ELECTRONICS

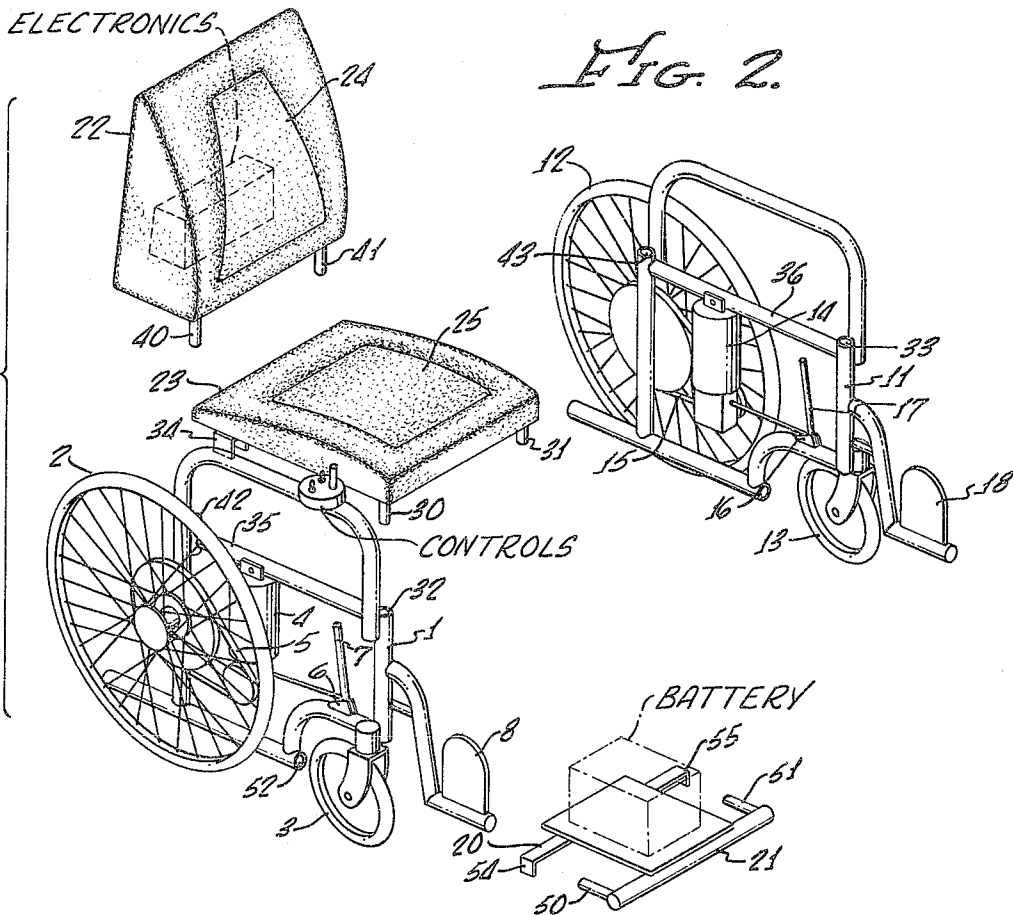


FIG. 2

MODULAR MOTORIZED WHEEL CHAIR

BACKGROUND OF THE INVENTION

A disabled individual who has temporarily or permanently lost the use of his legs must usually depend upon a mechanical substitute, such as a wheelchair, to move himself about. Most prior art wheelchairs are manually operated; and require considerable exertion to negotiate minor hills or travel distances. Moreover, in a situation where the individual has both a leg and arm impairment, the manually operated wheelchair can be quite difficult to propel. As a consequence, a number of motor powered wheelchairs have been marketed. These vehicles normally utilize two separate driving motors. One of the drive motors is connected to the left rear wheel by a pulley and the other is connected to the right rear wheel in the same manner. Steering is effected by an electronic system under control of the operator. The system applies power simultaneously to both wheels to move the chair forward, backward, or to rotate the chair in a circle. Power can also be applied to one wheel alone to turn the vehicle left or right.

While the conventional motorized wheelchair obviates the aforementioned problems of the manually powered device, it has several shortcomings. Paramount among these is the additional weight. Such wheelchairs are typically designed to fold up so that they can be transported in the trunk of an automobile or the back of a station wagon. But the additional weight imposed by the battery, motors and structural members make it difficult for most persons to lift or move them about. Consider for example, a typical situation involving a middle-aged wife having an invalid husband. Whenever they travel by auto, they must always seek the aid of a third person to lift the folded motorized chair "IN" and "OUT" of the auto. What is actually desired is a motorized wheelchair which can be easily disassembled into lightweight components for transportation and then easily reassembled.

A secondary disadvantage of the conventional folding wheelchair is discomfort. In order to facilitate its collapsibility, it has been necessary to make the seat portion relatively flat so as to severely limit the amount of contour and padding. Considering that persons who are confined to wheelchairs spend most of their life in this seat, the importance of comfort will be readily appreciated.

Accordingly, a primary object of the present invention is to provide a modular wheelchair which can be easily assembled and disassembled.

A further object of the present invention is to provide a wheelchair which consists of a number of modular components, all of which are of a weight and size such that they can be easily lifted and managed by persons of moderate strength.

A further object of the present invention is to provide a modular wheelchair having a comfortable and contoured seat.

Other objects and advantages of the present invention will be obvious from the detailed description of a preferred embodiment given herein below.

SUMMARY OF THE INVENTION

The aforementioned objects are realized by the present invention which comprises a wheelchair consisting of five primary modules, namely; a left side module in-

cluding one drive motor and drive wheel, a right side module including a drive motor and drive wheel, a bottom platform including a battery and frame for its retention, a bucket seat bottom and a bucket seat back. The bottom platform as well as the bucket seat back and bottom each include protruding members which are adapted to slip into accordant openings in the two side modules.

DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a perspective view of the modular wheelchair as it would appear when fully assembled.

FIG. 2 shows an exploded perspective view of the chair illustrating the various modules and how they connect.

DESCRIPTION OF A PREFERRED EMBODIMENT

Adverting to the drawings, and particularly FIG. 2, a preferred embodiment of the invention comprises a wheelchair, which includes five separate modular components, namely; a left side module, a right side module, a battery support frame, a seat back and a seat bottom. The left side module is comprised of a frame 1, a drive wheel 2, a castor mounted front wheel 3, a motor 4 and drive pulley 5 which is tightened by the overcenter toggle arrangement 6 via hand lever 7, and rotatable foot rest 8. The right side module includes the corresponding elements 11-18 respectively. The battery support frame includes platform 21 which is attached to the two frame members 20 and 21. Both the back and bottom of seat components 22 and 23 have recessed padded depressions (24 and 25 respectively) to effect what is commonly known as a bucket seat.

Each of the modular components include connecting elements which function to interlock the modules so as to form the assembled wheelchair shown in FIG. 1. For example, the seat bottom 23, has two projections 30 and 31 which are adapted to slip into the holes 32 and 33 respectively of the side frames 1 and 11. The yoke 34 on the left side seat bottom 23 is spaced to straddle the frame 1 at the point indicated by the numeral 35. A corresponding yoke on the right side of seat bottom 23 (not shown) functions to straddle the frame 11 at the point indicated by numeral 36. The projections 40 and 41 on the bottom of the seat back 22 are spaced to slip into the accordant holes 42 and 43 respectively. The projections 50 and 51 on bar 21 are adapted to slip into the openings 52 and 53, the battery support frame being restricted from lateral motion by the flanges 54 and 55 which slightly overhang the side frames 1 and 11 as indicated by the numeral 60.

The ease of assembly and disassembly will be evident from the drawings. There are no knobs to turn or screws to tighten. The seat back 22 and seat bottom 23 can be removed by simply lifting upwards. The battery support and battery can be removed pulling forward to clear projections 50 and 51 and then upwardly.

An experimental unit has been fabricated using hollow, stainless steel framework. Exclusive of the battery, no modular component weighed more than 22 lbs. Each module could be easily lifted and handled by a person of moderate strength. Moreover, the modular coupling is designed so that each module is essentially thin and flat. The modules can be stacked - one on top of the other with a total height of less than 18 inches.

As previously mentioned, the conventional folding wheelchair cannot utilize the deep comfortable bucket

style seats. Nor can they be easily disassembled - but must generally be moved as a complete unit. The present invention, on the other hand, is easily taken apart and assembled. When it is assembled, as shown in FIG. 1, it is considerably more comfortable than the flat, lightly padded foldable wheelchairs.

It will be evident that the basic concept of the invention is not limited to motorized wheelchairs. It could be used with equal applicability on any manually operable device which, on occasion, must be transported from place to place. Nor are the teachings of the invention restricted to the particular modular arrangement shown. Moreover, the modules may be made to connect to one another in a variety of ways other than in the particular manner demonstrated. Thus, although a preferred embodiment has been shown and described, it will be understood that the invention is not limited thereto, and that numerous changes, modifications, and substitutions may be made without departing from the spirit of the invention.

We claim:

1. A wheelchair comprising:

a left side module including a left frame, a left rear drive wheel having a horizontal axis of rotation and a castor mounted front wheel;

a first motor and a means for connecting the output of said first motor to said left rear drive wheel;

a right side module including a right frame, a right rear drive wheel having a horizontal axis of rotation and a castor mounted front wheel;

a second motor and a means for connecting the output of said second motor to the right rear drive wheel;

a seat comprised of a bucket shaped back module and a bucket shaped bottom module;

means for attaching said seat to said left and right frames so as to enable said seat to be easily and quickly detached from said frames said means comprising:

a pair of substantially vertical elongated projections on the bottom of said bucket shaped back module, said projections being spaced apart so as to be substantially coplanar with said left and right frames, and;

a member of said left frame having an opening adapted to receive one of said bucket seat back projections, and;

a member of said right frame having an opening adapted to receive the other of said bucket seat back projections;

at least one pair of substantially vertical elongated projections on the bottom of said bucket shaped bottom, said projections being spaced apart so as to be substantially coplanar with said left and right side frames, and;

a member of said left frame having an opening adapted to receive one of said bucket seat bottom projections;

a member of said right frame having an opening adapted to receive the other of said bucket seat back projections;

a battery support platform and means for attaching said battery support platform to said left and right frames so as to permit said battery support platform to be easily and quickly removed from said frames.

2. The apparatus recited in claim 1 wherein said means for attaching said battery support platform comprises:

a pair of elongated substantially horizontal projections on said support platform and a member of said left frame having an opening adapted to receive one of said projections and a member of said right frame having an opening adapted to receive the other of said projections.

3. A wheelchair comprising:

a left side module including a left frame, a left rear drive wheel having a horizontal axis of rotation, and a castor mounted front wheel;

a right side module including a right frame, a right rear drive wheel having a horizontal axis of rotation and a castor mounted front wheel;

a seat comprised of a back module and a bottom module;

means for attaching said seat to said left and right frames so as to enable said seat to be easily and quickly detached from said frames, said means comprising:

a pair of substantially vertical elongated projections on the bottom of said back module, said projections being spaced apart so as to be substantially coplanar with said left and right frames and;

a member of said left frame having an opening adapted to receive one of said back module projections, and;

a member of said right frame having an opening adapted to receive the other of said back module projections;

at least one pair of substantially vertical elongated projections on the bottom of said bottom module, said projections being spaced apart so as to be substantially coplanar with said left and right side frames, and

a member of said left frame having an opening adapted to receive one of said bottom module projections;

a member of said right frame having an opening adapted to receive the other of said bottom module projections.

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