



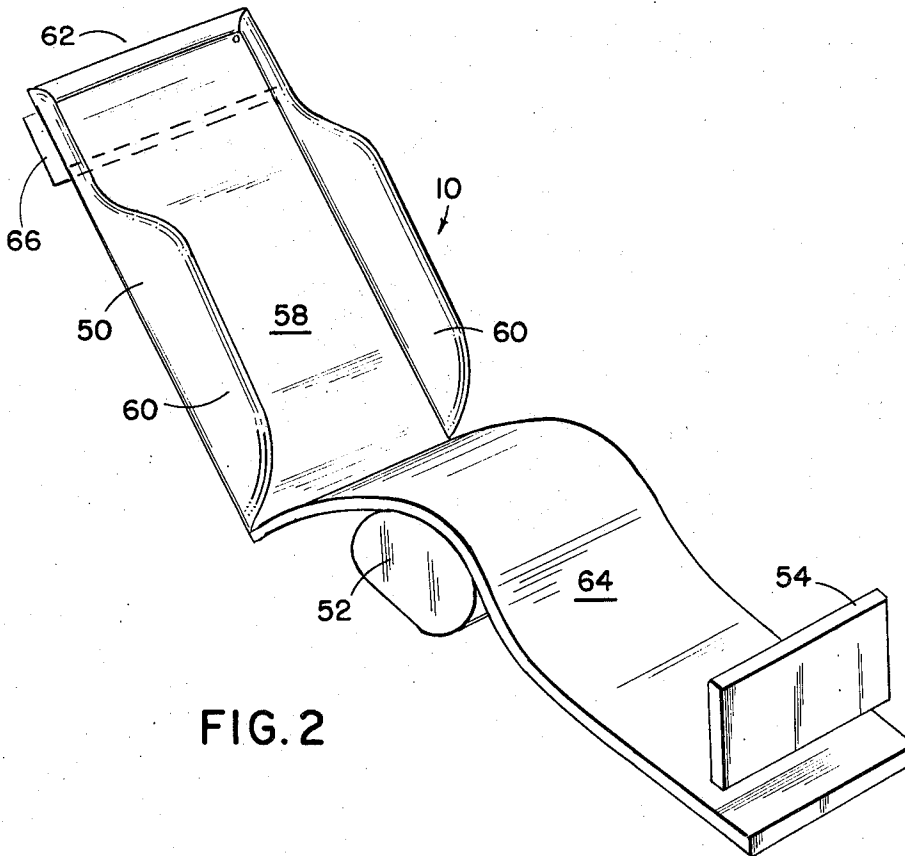
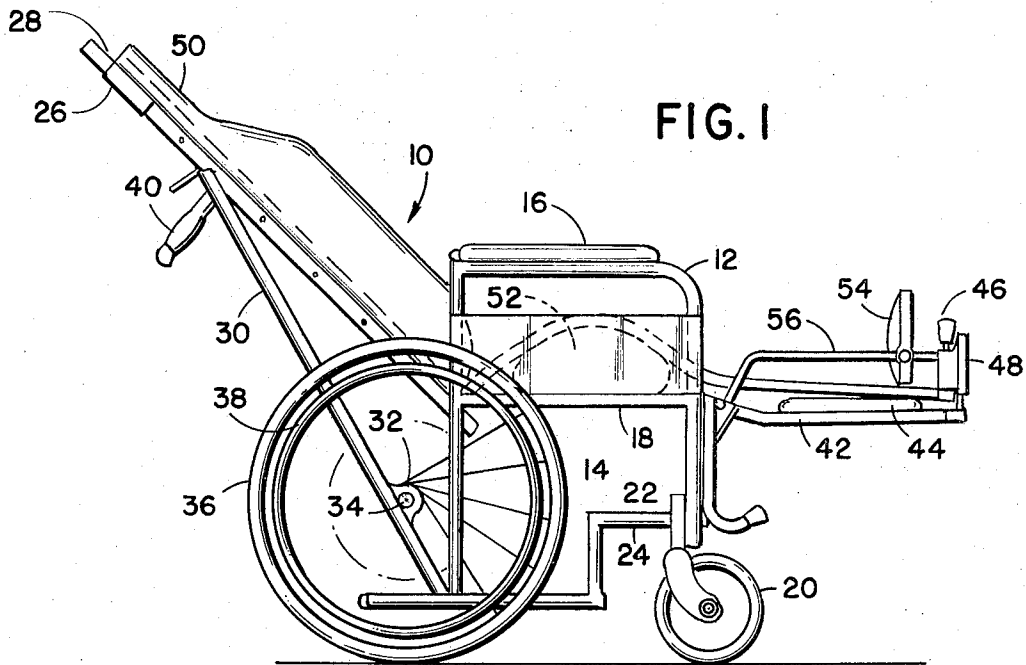


FIG. 2

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## WHEEL CHAIR ASSEMBLY AND BODY-SUPPORTING INSERT THEREFOR

### BACKGROUND OF THE INVENTION

The present invention relates generally to wheel chairs and, more particularly, to the body-supporting portions thereof.

Broadly speaking, wheel chairs in general use at present comprise the following elements. A pair of vertical side frame members are separated by the width of the wheel chair seat which is supported therebetween, with arm rests along their upper horizontal edges, and are maintained in position by suitable rigid cross-members beneath and behind the seat. Each side member is mounted at its forward edge on a freely rotatable front wheel or caster of relatively small size. Near the rearward edge of each side member an outwardly extending shaft is provided with bearings supporting a large, spoked rear or drive wheel, which generally is provided with a spaced ring of slightly smaller diameter whereby a patient may propel himself by hand. An adjustable back portion is mounted to the side members for rotation about an axis behind and just below the seat portion, means being provided for fixing the back portion at a desired inclination. The back portion is also generally provided with rearwardly extending handles or a transverse handle bar so that the wheel chair may be pushed. Each side member also supports, at its forward edge, a pivoted leg and foot support portion, which may be independently pivoted from the vertical to the forwardly extending horizontal position, locking means being provided to secure same in any desired position. Each foot support can be pivoted out of the way if necessary. A friction brake assembly cooperating with one or both rear wheels may be engaged to prevent the wheel chair from rolling. The seat is generally a rectangular or square piece of leather or fabric slung between the opposed side members. The back portion is of the same material attached to the back frame, which is shaped as an inverted "U".

While wheel chairs of the type described are satisfactory for intermittent or purely utilitarian usage, such as transporting a patient from one point to another within a hospital, they are most unsatisfactory for use by permanently disabled persons or others suffering from acute or chronic disorders preventing walking for extended periods. These problems are particularly severe with children having motor control disorders, such as spastics. Some of these problems are discussed below with particular reference to the latter category of patient. permanently

The back portion of the chair, being essentially straight or only slightly curved, provides essentially no restraint on sideward movement of a child, and children lacking motor control can readily fall out.

The separation between the back and seat portions causes discomfort, as there is no attempt to follow the body contours and provide support where needed.

Children not tall enough to reach the foot rests tend to slip down, causing further discomfort. More seriously, so-called "drop foot" can result when the leg and foot rests are in the vertical position but the child's foot is not supported. On the other hand, with the legs supported in the horizontal position for extended periods, tendons in the patients' legs tend to tighten, causing

discomfort. The foot supports, being generally bare, cold metal, are uncomfortable for shoe-less patients.

To maintain hospital standards of cleanliness, the back and seat portions must be provided with washable covers, a maintenance cost factor.

Lastly, the general utilitarian appearance, discomfort and lack of support or restraint can contribute to feelings of insecurity, dislike or fear, particularly amongst children, which is deleterious to proper care.

Prior art designs of wheel chairs have included individual features of the present invention such as raised edges, upholstering, and foot rests adjustable over a short distance, but not in the form of the present invention, which is adapted for use with either existing wheel chairs or as original equipment. Reference is made to the following U.S. Pat. in this connection: No. D-182,178, No. D-184,040, No. 2,769,483 and No. 3,290,050.

### OBJECTS OF THE INVENTION

It is a general object of the present invention to overcome the noted defects and problems in prior art wheel chairs.

A further object of the present invention is to provide a safe, comfortable and secure wheel chair body-support apparatus.

Another object of the present invention is to provide a body-support insert for wheel chair frames.

Various other objects and advantages of the invention will become clear from the following description of a preferred embodiment thereof, and the novel features will be pointed out in connection with the appended claims.

### THE DRAWINGS

Reference will hereinafter be made to the accompanying drawings, wherein:

FIG. 1 is a simplified side elevation view of a wheel chair incorporating the invention; FIG. 2 is a perspective view of the essential elements of the invention with, for greater clarity, the wheel chair structure omitted.

### DESCRIPTION OF EMBODIMENTS

A conventional wheel chair structure is shown in FIG. 1 with the body supporting insert of the invention 10 thereon. The body of the chair comprises a pair of parallel, vertical tubular steel side members 12 held in spaced relation by two tubular steel supports 14 arranged in an "X" configuration. The top of each side member 12 has an arm rest 16 attached thereto. A horizontal cross member 18 on each side member 12 is at seat height and supports the conventional wheel chair seat (not shown) therebetween. Front wheels 20 are of the caster type so as to rotate freely about the axis of vertical shaft 22 on which they are mounted. Shaft 22 rotates in a bracket or collar attached to side member 12 at the frontal lower corner thereof, side member 12 being recessed 24 so as not to be in the way of wheels 20.

A U-shaped tubular steel back frame 26 has a leg rotatably attached to each of the side members 12 at a point just below the rear of the seat, and the chair back 28 is attached to frame 26. Frame 26 is further supported by tubular steel supports 30 which slidably engage the legs of frame 26 and include a mechanism (not shown) for locking frame 26 in a desired position. The

lower ends of supports 30 are rotatably secured to the bottom rear portions of side members 12. Supports 30 also carry brackets 32 for rear wheel shaft 34, on which rear wheels 36 are mounted with suitable bearings. Rear wheels 36 include a spaced ring 38 mounted so that a patient who is able may propel himself in the chair. Handles 40 are provided at the point where support 30 and back frame 26 are joined for use by a person pushing the chair.

As shown in FIG. 1, the leg and foot rests are in their extended or horizontal position. In particular, a tubular steel arm 42 is rotatably mounted on each of side members 12 below and at a front corner of the seat. Each arm 42 supports a leg rest 44 along its length and has an upturned end portion 46 to which a foot rest 48 is rotatably attached. Arms 42 are independently rotatable from the position shown to the vertical or down position and may be locked at any desired position. 42

The foregoing describes an essentially conventional wheel chair structure which is suitable for use in conjunction with the present invention.

The invention 10 is illustrated in FIG. 1 and FIG. 2 and comprises a one-piece upholstered body support 50, a bolster 52, and an upholstered foot rest 54 adjustably mounted on a pair of rails 56.

The body support 50 is constructed of a firm but resilient material such as plastic foam, and is covered in a comfortable but easily cleaned material such as Naugahyde (trademark). As best seen in FIG. 2, body support 50 comprises a head and back portion 58 having raised sides 60. A raised edge 62 may be provided along the top but is not necessary. Head and back portion 58 is adapted for attachment to back frame 26 by a fabric sleeve 66, snaps or any other convenient means (not shown), so that the entire body support 50 may be removed and cleaned as required.

The contour of raised sides 60 is such that a patient is restrained from falling sideways, but his line of sight is not impaired. In particular, the raised sides 60 extend from approximately shoulder level to the bottom of head and back portion 58. The latter feature is also advantageous in that a patient can be fed by an attendant without inconvenience.

Integral with head and back portion 58 at its lower edge is the extending buttock and leg portion 64 which is as wide as the seat of the wheel chair and long enough to reach foot rest 48.

A bolster 52 is provided as a separate element so that it may be placed on the seat of the wheel chair at a point beneath the knees of the patient when the foot rests are extended. This prevents the patient (particularly children) from "slipping down," and maintains the legs in a comfortable position.

In general, the head and back portion 58 is an essentially rigid structure, whereas the buttock and leg supporting portion 64 is essentially flexible. The former may include a thicker (2 inches) layer of foam than the latter (1 inch).

The padded foot rest 54 is adjustably secured to a pair of L-shaped rails 56 attached on the short-arm side near the inner end of arm 42 and on the long-arm side to the upturned end portion 46 of the foot rest assembly. This arrangement assures proper foot support at all times for a patient of essentially any size.

It will be appreciated that the present invention may be constructed as original equipment on a wheel chair frame or may be constructed as an accessory for instal-

lation on existing wheel chairs. In the former case, the frame may be conveniently provided with snaps or like securing devices along the edges of back frame 26 so that the body support may be readily removed. Also, rails 56 may be permanently affixed to arm 42 and end portion 46. In the latter case, it may be more convenient to provide a piece of fabric 66 (FIG. 2) secured to the top edge 62 and sides 50 at the rear of head and back supporting portion 58 which may be merely slipped over the uppermost portion of back frame 26, thus securing the insert in position. Also in the latter case, foot support rails 56 will be provided with suitable clamp means for securing same in position. Thus, as a wheel chair accessory, the invention requires no physical alteration of existing structures.

The invention may be constructed in various ways and with a variety of materials, but the following description provides satisfactory results. It is not, however, to be construed in a limiting sense.

One-half inch plywood is used to provide the base of back support 58 and 1/4 inch plywood is cut to form the raised sides 60 and top edge 62. These pieces are glued together. One-inch foam rubber is cut to fit back support 58, and 2-inch foam rubber is used for sides 60 and top edge 62. Suitable covering material is cut to fit each section and is secured to the plywood and over the foam rubber with a combination of stitching and upholstery tacks. A loop of material 66 is attached to the back side of back support 58 so that the unit may be slid over the wheel chair frame. Alternatively, two flaps could be provided at either side and cooperate with snaps on the back of support 58 to secure the device.

Leg support 64 is a piece of 1 1/2-inch foam rubber covered with suitable material but with no plywood backing, so as to remain flexible. It is stitched by machine to the lower end of support 58. Snaps under the lower corners thereof and on the foot rest may be employed to keep this section from moving, but are not required.

The foot rest 54 is constructed of 3/4-inch plywood covered with foam rubber and suitable material. Rails 56 are cut and formed and secured to the existing foot rest at each end with through bolts. A metal bracket is screwed into the plywood back of footrest 54 on each side and supports an adjustable clamp, which rides on rails 56, a wing nut being provided for adjustment purposes.

Bolster 52 may be merely cut from a block of relatively stiff foam and covered with material, or it can be constructed from 1/4-inch plywood, covered with 1/2-inch foam and upholstered. It is as wide as the chair seat and, generally, about 6-inches high at its highest point.

Various changes in the details, steps, materials and arrangements of parts, which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention as defined in the appended claims.

I claim:

1. A body-supporting insert for use on a wheel chair having a back, a seat and a leg and foot support comprising:

an upholstered top section including a head supporting portion; a back supporting portion, and outwardly extending side restraining walls fixedly mounted substantially perpendicularly to said top

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section, said side walls extending outwardly along said back supporting portion and being reduced in size along said head supporting portion of said top section, said top section being removeably securable to the back of said wheel chair; and

an upholstered bottom section including a buttock supporting section and a leg supporting portion, said bottom section being integral with said top section along the lower edge thereof and extending to the foot supports of said wheel chair.

2. The body-supporting insert as claimed in claim 4, and additionally comprising bolster means for insertion on the seat or leg support of said wheel chair beneath said leg supporting portion under a patient's knees.

3. The body-supporting insert as claimed in claim 1, wherein both said head and back supporting portion and said buttock and leg supporting portion comprise a resilient plastic foam material covered with a fabric material.

4. The body-supporting insert as claimed in claim 1, wherein said head and back supporting portion is secured to said back by snap means.

5. The body-supporting insert as claimed in claim 1, wherein said head and back supporting portion is secured to said back by a piece of fabric material secured to said head and back supporting portion along the uppermost edge and a portion of the adjoining sides.

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