A connecting device for a joystick controller on an electric wheelchair has a post, two rods and a base. The post has two brackets attached to the post. The two rods are pivotally attached respectively to the two brackets in parallel with each other. The base is pivotally attached to the two rods to achieve a four-bar linkage. The joystick controller is adjustably and detachably mounted on the base. The four-bar linkage keeps the joystick controller oriented in a constant direction when the base moves relatively to the electric wheelchair. Therefore, the joystick controller has a fixed orientation relative to the wheelchair.
CONNECTING DEVICE FOR A JOYSTICK CONTROLLER ON AN ELECTRIC WHEELCHAIR

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to a connecting device, and more particularly to a four-bar linkage that holds a joystick controller in a constant orientation.

[0003] 2. Description of Related Art

[0004] Electric wheelchairs are a convenient mode of transportation for patients, aged people or handicapped people because they can go anywhere by moving a joystick without assistance from other people.

[0005] A conventional electric wheelchair has a seat, two arms, a joystick and a connecting device attached to one arm and the joystick. The connecting device is a rod pivotally connecting the joystick to the arm so that the joystick extends out from the arm. By pivoting the connecting device, the joystick can move aside to keep the joystick from bumping against objects when a user moves close to a table or a wall. However, the orientation of the joystick changes when the connecting device pivots relatively to the electric wheelchair. Consequently, adjusting the direction of movement of the joystick after every movement of the connecting device is inconvenient.

[0006] To overcome the shortcomings, the present invention provides an improved connecting device for a joystick controller on an electric wheelchair to obviate the aforementioned problems.

SUMMARY OF THE INVENTION

[0007] The main objective of the invention is to provide a connecting device that keeps a joystick connected to the connecting device from changing its operational orientation.

[0008] Other objects, advantages and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1 is a perspective view of a connecting device in accordance with the present invention mounted on an electric wheelchair;

[0010] FIG. 2 is an exploded perspective view of the connecting device in FIG. 1 and the wheelchair seat;

[0011] FIG. 3 is an enlarged partially exploded perspective view of the connecting device in FIG. 1 attached to an electric wheelchair arm;

[0012] FIG. 4 is an enlarged perspective view of the connecting device in FIG. 1 attached to an electric wheelchair arm;

[0013] FIG. 5 is an operational bottom view of the connecting device in FIG. 1 positioned back and near the wheelchair;

[0014] FIG. 6 is an operational bottom view of the connecting device in FIG. 1 extended out from the wheelchair; and

[0015] FIG. 7 is an operational bottom view of the connecting device in FIG. 1 positioned forward and near the wheelchair.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

[0016] A connecting device for a joystick controller on an electric wheelchair in accordance with the present invention comprises a post, two rods and a base. The post has two brackets attached to the post. The two rods are pivotally attached respectively to the two brackets in parallel with each other. The base pivotally attached to the two rods forms a four-bar linkage with the two rods and the post. The joystick controller is adjustably and detachably mounted on the base. The four-bar linkage keeps the joystick controller oriented in a constant direction when the base moves relatively to the electric wheelchair. Therefore, the joystick controller has a fixed orientation relative to the wheelchair.

[0017] With reference to FIGS. 1 to 3, a preferred embodiment of the connecting device in accordance with the present invention attaches a joystick controller (40) to an arm of an electric wheelchair (1) and comprises a post (10), two rods (20) and a base (30).

[0018] The post (10) is attached under an arm of an electric wheelchair, is a rectangular tube and has a front face, an outer face, two brackets (102) and two pivot pins (104). The two brackets (102) are attached respectively to the front face and the outer face in a single horizontal plane. Thus, the two brackets (102) are oriented perpendicular to each other. Each bracket (102) is U-shaped, has a cross member and two wings and is attached to the post (102) at the cross member so the wings protrude out from the post (10). Each wing of the bracket (102) has a hole, and the holes on the two wings are aligned with each other. The pivot pins (104) are mounted through the holes respectively in the two brackets (102).

[0019] Each rod (20) has a proximal end, a distal end, a length and two transverse end sleeves (22). The two rods (20) are the same length and are pivotally attached respectively to the two brackets (102) on the post (10) in parallel to attach to the base (30). The transverse end sleeves (22) are formed respectively at the proximal end and the distal end. Each transverse end sleeve (22) has a top, a bottom and two bushings (202) mounted respectively on the top and bottom. The transverse end sleeve (22) at the proximal end is aligned with the holes in the two wings and mounted pivotally between the two wings of one corresponding bracket (102) with the pivot pin (104).

[0020] The base (30) is connected pivotally to the distal ends of the two rods (20), is a rectangular panel and has four corners, a top face, a rear edge, a front edge, an inner edge, an outer edge, two mounting holes (302), two pivot pins (308), multiple adjustment holes, a U-shaped mounting bracket (304), a T-connector (32), multiple fasteners and a knob (34).

[0021] The two mounting holes (302) are formed diagonally through the base (30) respectively at the corner between the rear edge and the outer edge and the corner between the front edge and the inner edge.

[0022] The pivot pins (308) extend respectively through the mounting holes (302) and pivotally attach the transverse
end sleeves (22) at the distal ends of the rods (20) to the base (30). Therefore, the two mounting holes (302) in the base (30), the two rods (20) and the two brackets (102) on the post (10) define a four-bar linkage.

[0024] The adjustment holes are formed in a line through the base (30) parallel to the outer edge near the front edge.

[0024] The U-shaped mounting bracket (304) is attached to the top face of the base (30) and has multiple through holes (306) and a channel. The through holes (306) are defined through the U-shaped mounting bracket (304), communicate with the channel and respectively correspond to align with the adjustment holes in the base (30).

[0025] The T-shaped connector (32) has a crossbar, a longitudinal adjustment leg, three attachment holes (322) and two fasteners. The crossbar has two ends. Two attachment holes (322) are formed through the crossbar respectively near the two ends, and the other attachment hole (322) is formed through the longitudinal adjustment leg. The T-connector (32) is attached to the joystick controller (40) by fasteners that pass through the attachment holes (322) on the crossbar and detachably attach to the joystick controller (40). The longitudinal adjustment leg is mounted in the channel in the U-shaped mounting bracket (304). The attachment hole (322) through the longitudinal adjustment leg is selectively aligned with a through hole (306) in the U-shaped mounting bracket (304) to accommodate a particular user. Then, the knob (34) screws through the U-shaped mounting bracket (304) and the attachment hole (322) to attach the T-connector (32) and the joystick controller (40) to the base (30).

[0026] With reference to FIGS. 4 to 7, the four-bar linkage of the connecting device maintains the same orientation of the joystick controller (40) even when the base (30) is moved relatively to the wheelchair. Therefore, operation of the joystick controller (40) results in the same relative movement of the wheelchair. Moreover, transportation of the electric wheelchair is convenient because the joystick controller (40) is detachable from the base (30) by disengaging the knob (34) in a convenient way.

[0027] Even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and function of the invention, the disclosure is illustrative only. Changes may be made in detail, especially in matters of shape, size, and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

What is claimed is:

1. A connecting device for a joystick controller on an electric wheelchair, the connecting device comprising:
   a post (10) having two brackets (102) attached to the post (10) in a single horizontal plane;
   two rods (20) pivotally attached respectively to the two brackets (102) in parallel with each other; and
   a base (30) pivotally attached to the two rods (20).
2. The connecting device as claimed in claim 1, wherein the post (10) is a rectangular tube and has
   a front face;
   an outer face; and
   the two brackets (102) attached respectively to the front face and the outer face, and each bracket (102) being U-shaped and having a cross member attached to the post (10) and two wings connecting to the cross member and extending outward from the post (10).
3. The connecting device as claimed in claim 2, wherein each rod has
   two ends; and
   two transverse end sleeves (22) formed respectively at the two ends, each transverse end sleeve (22) has a top, a bottom, and two bushings (202) mounted respectively in the top and the bottom; and
   each bracket (102) has a pivot pin (104) penetrating the wings of the two bracket (102) and the transverse end sleeves (22) of the two rods (20).
4. The connecting device as claimed in claim 2, wherein the base (30) is rectangular and has:
   four corners;
   a top face;
   a rear edge;
   a front edge;
   an inner edge;
   an outer edge;
   two mounting holes (302) formed diagonally through the base (30) respectively at one of the four corners between the rear edge and the outer edge and at one of the four corners between the front edge and the inner edge;
   two pivot pins (308) extending respectively through the mounting holes (302) and pivotally attaching the rods (20) to the base (30);
   multiple adjustment holes formed in a line through the base (30) parallel to the outer edge near the front edge;
   a U-shaped mounting bracket (304) attached to the top face of the base (30) and having
   a channel defined between the U-shaped mounting bracket (304) and the base (30); and
   multiple through holes (306) defined through the U-shaped mounting bracket (304), communicating with the channel and correspondingly to align with the adjustment holes in the base (30);
   a T-shaped connector (32) engaging the U-shaped mounting bracket (304) and having
   a crossbar having two ends;
   a longitudinal adjustment leg mounted in the channel in the U-shaped mounting bracket (304);
   three attachment holes (322) with two attachment holes (322) formed respectively through the crossbar near the ends and the other attachment hole (322) formed through the longitudinal adjustment leg to selectively align with one through hole (306) in the U-shaped mounting bracket (304); and
two fasteners passing through the attachment holes (322) in the crossbar and attaching to the joystick controller (40) to attach the T-connector (32) to the joystick controller (40); and

a knob (34) screwing through the U-shaped mounting bracket (304) and the attachment hole (322) in the longitudinal adjustment leg.

5. The connecting device as claimed in claim 3, wherein the base (30) is rectangular and has:

four corners;
a top face;
a rear edge;
a front edge;
an inner edge;
an outer edge;

two mounting holes (302) formed diagonally through the base (30) respectively at one of the four corners between the rear edge and the outer edge and at one of the four corners between the front edge and the inner edge;

two pivot pins (308) extending respectively through the mounting holes (302) and pivotally attaching the transverse end sleeves (22) at the ends of the two rods (20) to the base (30);

multiple adjustment holes formed in a line through the base (30) parallel to the outer edge near the front edge;

a U-shaped mounting bracket (304) attached to the top face of the base (30) and having

a channel defined between the U-shaped mounting bracket (304) and the base (30); and

multiple through holes (306) defined through the U-shaped mounting bracket (304), communicating with the channel and correspondingly to align with the adjustment holes in the base (30);

a T-shaped connector (32) engaging the U-shaped mounting bracket (304) and having

a crossbar having two ends;
a longitudinal adjustment leg mounted in the channel in the U-shaped mounting bracket (304);
three attachment holes (322) with two attachment holes (322) formed respectively through the crossbar near the ends and the other attachment hole (322) formed through the longitudinal adjustment leg to selectively align with one through hole (306) in the U-shaped mounting bracket (304); and

two fasteners passing through the attachment holes (322) in the crossbar and attaching to the joystick controller (40) to attach the T-connector (32) to the joystick controller (40); and

a knob (34) screwing through the U-shaped mounting bracket (304) and the attachment hole (322) in the longitudinal adjustment leg.