【DESCRIPTION】

【Invention Title】

WHEELCHAIR BRAKE SYSTEM

【Technical Field】

The present invention relates to a wheelchair brake system, and more particularly to a wheelchair brake system which is in a brake lock mode as usual as when a user stands up from a wheelchair, but automatically releases a brake only if a user sits down on the wheelchair or folds up the wheelchair, so that the wheelchair can move only when a user sits down thereon or it is folded, thereby preventing a user from getting hurt from a fall at a moment when the user sits down on and stands up from the wheelchair.

【Background Art】

In general, a wheelchair refers to a means of transportation for a less able-bodied person, which is pushed by a person who is sitting down thereon or by an assistant from behind.

Since a user who needs the wheelchair is the less able-bodied person, it is very dangerous at a moment when s/he sits down on or stands up from the wheelchair. The wheelchair can move while the user is sitting down on or standing up from the wheelchair, and thus often cause accidents where the user gets hurt from a fall.

To solve the foregoing problems, there has been developed a wheelchair with a brake. However, a conventional wheelchair brake system still has a problem of causing the fall accidents since artificial control is needed to actuate the brake of the wheelchair like that of a bicycle.

【Disclosure】

【Technical Problem】

The invention is defined in the independent claims. Some optional features of the invention are defined in the dependent claims.

The wheelchair brake system disclosed herein may solve the foregoing problems. A wheelchair brake system which is in a

brake lock mode to stop if no one sits down on a wheelchair, but releases a brake to move only if a user properly sits down on the wheelchair, thereby preventing a user from getting hurt from a fall due to movement of the wheelchair at a moment when the user sits down on and stands up from the wheelchair may be provided.

【Technical Solution】

A wheelchair brake system may comprise; a brake which is provided in a wheel of a wheelchair; and a brake actuation controller which connects with the brake and locks and releases the brake, wherein the brake is usually in a lock mode, but the brake actuation controller controls the brake to be switched over from the lock mode to a release mode if sensing that a user sits down on the wheelchair or the wheelchair is folded up.

The brake actuation controller comprises: a connection member which has a first end elastically connecting with the brake; a brake switching member to which a second end of the connection member is fixed, and which actuates the connection member connecting with the brake to release the brake when a user sits down on the wheelchair, but returns the connection member to switch the brake over to the lock mode when the user stands up from the wheelchair.

The connection member comprises a cable or a bar; the brake switching member is non-motorized or motorized for automatic actuation.

The non-motorized brake switching member comprises: a sensing frame which is provided beneath a seat of the wheelchair, and accommodates a second end of the cable therein to be fixed and connected thereto; and an upper plate which couples with the sensing frame and changes tension of the cable by pressing the cable accommodated in the sensing frame when a user sits down on the seat.

The upper plate comprises a cable accommodator; the cable accommodator does not press the cable when no one sits down on the wheelchair, but presses the accommodated cable as the upper plate moves down when a user sits down on the wheelchair; and the brake is released since the cable is tensed in a direction opposite to the brake when the cable is pressed.

The sensing frame and the upper plate are divided into a plurality of units; at least one of cables is connected to the respective units is connected to the brake; and the brake is switched over from the lock mode to the release mode when at least one among the plurality of units is actuated.

The motorized brake switching member comprises: a sensing frame which is provided beneath a seat of the wheelchair, accommodates a second end of the cable therein to be fixed and connected thereto, and comprises an electric driver to electrically wind the cable to change tension; and an upper plate which couples with the sensing frame and comprises a sensor to sense whether a user sits down on the seat.

The electric driver comprises: an electric pulley for changing a winding direction of a cable, and winding the cable; a motor for providing torque to drive the electric pulley; and a driving controller for controlling the torque of the motor, and the electric driver drives the motor to rotate the electric pulley to make tension act in an opposite direction of the brake and release the brake when a pressure sensor provided in the upper plate senses that a user sits down on the wheelchair, but drives the motor to rotate in an opposite direction to rotate and return the electric pulley to its original position, to make the tension act toward the brake and to lock the brake when the user stands up from the wheelchair.

The electric driver further comprises a sensor unit such as an acceleration sensor and a tilt sensor, and the sensor unit is provided to make the brake be not only simply switched over between the lock mode and the release mode, but also automatically actuated for safety when the wheelchair moves at an excessively high speed or on a slope.

【Advantageous Effects】

According to an embodiment, a wheelchair brake system has an effect on preventing a user from getting hurt from a fall due to movement of the wheelchair at a moment when the user sits down on and stands up

from the wheelchair since it is in a brake lock mode to stop if no one sits down on a wheelchair, but releases a brake to move only if a user properly sits down on the wheelchair.

【Description of Drawings】

FIG. 1 schematically shows a wheelchair according to an embodiment.

FIG. 2 schematically shows a wheelchair according to another embodiment.

FIG. 3 schematically shows sensing frames and upper plates which are divided into four units according to an embodiment.

FIG. 4 schematically shows sensing frames and upper plates which are divided into two units according to an embodiment.

FIG. 5 schematically shows actuation of a brake in the wheel chair of FIG. 3.

FIG. 6 schematically shows that the wheelchair is folded up.

FIG. 7 schematically shows a wheelchair brake system according to still another embodiment, and FIG. 8 is a detailed view of FIG. 7.

FIG. 9 schematically shows a motorized wheelchair brake system according to an embodiment.

FIG. 10 schematically shows a brake according to an embodiment.

FIG. 11 schematically shows that a switching member according to an embodiment is a safety device given in the form of a safety bar or a seat belt, FIGs. 12 to 15 are detailed views of the safety bar provided as the switching member of FIG. 11, and FIGs. 16 to FIG. 18 are detailed views of the seat belt provided as the switching member of FIG. 11.

FIGs. 19 to 21 schematically show a structure where a footrest is used as a switching member for the brake according to an embodiment.

【Best Mode】

A wheelchair brake system may include a brake provided in a wheel of a wheelchair, and a brake actuation controller connected to the brake and locking and releasing the brake, in which the brake is usually in a lock mode but is released from the lock mode in sync with actuation of a safety device sensed by the brake actuation controller when a user sits down on the wheelchair.

【Mode for Invention】

Below, embodiments will be described in detail with reference to the accompanying drawings.

FIG. 1 schematically shows a wheelchair according to an embodiment.

Referring to FIG. 1, a wheelchair brake system according to an embodiment includes a brake 20 provided in a wheel of a wheelchair, and a brake actuation controller 10 connected to the brake 20 and locking and releasing the brake 20, in which the brake is usually in a lock mode but is released from the lock mode by the brake actuation controller 10 when a user properly sits down on the wheelchair or when the wheelchair is folded up.

The brake actuation controller 10 may include a connection member 110 having a first end connected to the brake, and a brake switching member 120 coupled to a second end of the connection member 110 and actuating the connection member 110 connected to the brake to release the brake when a user sits down on the wheelchair but return the connection member 110 to switch the brake over to the lock mode when a user stands up from the wheelchair.

In other words, the brake switching member 120 switches the brake over to a release mode if a user sits down on the wheelchair, and returns the connection member 110 to an original state to switch the brake over to the lock mode if a user stands up from the wheelchair or the wheelchair is unfolded.

In more detail, the connection member 110 may be achieved by a cable or bar, and the cable is set to give tension to the brake so that the brake can keep the lock

mode if no one sits down on the wheelchair. Here, the cable refers to a member made of a wire (or a string).

That is, the brake is usually locked since the cable is kept to give tension so that the brake can be locked. However, the cable is automatically pulled in an opposite direction when a user sits down on the wheelchair, and thus the brake is released.

The brake switching member 120 may be non-motorized or motorized.

First, if the brake switching member 120 is non-motorized, the brake switching member 120 is placed beneath a seat of the wheelchair, and includes a sensing frame 121 holding, accommodating and connecting with a second end of the cable, and an upper plate 122 coupled to the sensing frame and pressing the cable accommodated in the sensing frame to switch a direction of applying the tension to the cable when a user sits down on the seat.

Specifically, the sensing frame 121 includes a cable accommodator, so that the cable accommodated in the cable accommodator can be free from pressure of the cable accommodator when no one sits down on the wheelchair, but be pressed by the cable accommodator as the upper plate moves down when a user sits down on the wheelchair.

If the cable is pressed as described above, the cable is tensed in an opposite direction to the brake and thus the brake is released from the lock mode.

Therefore, the brake is always kept in the lock mode if no one sits down on the wheelchair, but released only when a user sits down on the wheelchair.

FIG. 2 schematically shows a wheelchair according to another embodiment.

Referring to FIG. 2, the connection member 110a is achieved by not the cable but a bar, in which the connection member has a first end connected to the brake actuation controller 122a and includes a plurality of joints.

The actuation controller 122a is elastically coupled as a plate to a bottom of the seat of the wheelchair, and is thus elastically disposed downward when a user sits down on the wheelchair and returns to an original position when the user stands up from the wheelchair.

Further, the connection member 110a includes a central shaft aligned with a central shaft of the wheel, so that the central shaft thereof can connect with the brake of the wheel by the cable.

Therefore, when no one sits down on the wheelchair, the brake is in the lock mode by initial tension. On the other hand, when a user sits down on the wheelchair, the actuation controller 122a is elastically displaced downward and the connection member 110a integrally coupled to the actuation controller 122a is also displaced by the elastic displacement, thereby actuating the cable connected to the brake in the opposite direction to the initial tension and thus releasing the brake from the lock mode.

FIG. 3 schematically shows the sensing frames and the upper plates which are divided into four units according to an embodiment.

In this embodiment, the upper plate is divided into four units, but not limited thereto. Alternatively, the upper plate may be divided into two units as shown in FIG. 4. Likewise, it will be appreciated that the upper plate may be designed to be divided into various numbers of sections.

Referring to FIG. 3, the sensing frame 210 is sectioned into four units, and each unit is formed with a pulley assembly, thereby connecting with the connection member of the cable through the pulley assembly.

The pulley assembly may include a main pulley 211a for directly affecting the lock/release of the brake, and a sub pulley 211b for changing a direction of the cable without directly affecting the lock/release of the brake lock.

In each of four units, two main pulleys 211a are spaced apart at a predetermined distance and form a pair, and the cable is at least once wound on one main pulley and connected to the brake via the sub pulley 211b.

Like the number of divided units, there may be four cables. One cable is coupled to each unit, and two cables among four cables form a pair. Thus, the pair of cables is connected to each of two brakes.

In this embodiment, a first cable coupled to a first unit and a fourth cable coupled to a fourth unit form a pair and are connected to a first brake, and a second

When a user sits down on the wheelchair, the upper plate elastically coupled to the sensing frame moves down and the cable accommodated in the cable groove of the cable accommodator is pressed downward.

As described above, if the cable is pressed downward, the main pulley rotates as much as the displacement of the pressed cable. At this time, since the second end is the fixed end, pulling tension is generated at the elastic end coupled to the brake, thereby reversing the tension of acting toward the brake and thus releasing the brake from the lock mode.

Here, the upper plate is divided into four units, and one brake connects with two cables connected to two units, so that the direction of the tension acting on the brake can be reversed to release the brake if at least one among four units is pressed, thereby releasing the brake only when a user sits down on the wheelchair.

By adjusting the tension of the cable, it will be freely determined how many units among four units have to be pressed to release the brake.

FIG. 6 schematically shows that the wheelchair is folded up.

Referring to FIG. 6, when the wheelchair is folded, bending causes tension to be generated to pull the cable. Since the second end is the fixed end, the pulling tension is generated at the elastic end coupled to the brake, thereby reversing the direction of the tension acting toward the brake and thus releasing the brake from the lock mode.

FIG. 7 schematically shows a wheelchair brake system according to still another embodiment, and FIG. 8 is a detailed view of FIG. 7.

Referring to FIGs. 7 and 8, the wheelchair brake system employs a blocking bar 20a as a brake. When no one sits down on the wheelchair, the blocking bar 20a passes through and is caught in spokes of the wheel, thereby making the wheelchair be in the lock mode.

On the other hand, when a user sits down on the wheelchair, the blocking bar 20a elastically moves to the inside of the wheel and is thus released from the lock mode.

Here, the brake actuation controller 10a includes a flat spring formed beneath the seat of the wheelchair, a gear box for changing elasticity of the flat spring into

mechanical displacement, and an elastic member formed behind the gear box, so that the blocking bar can move inward as the elastic member is compressed as much as the displacement caused by the gear box.

Further, when a user stands up from the wheelchair, the elasticity of the flat spring is removed to cause the mechanical displacement of returning a gear assembly to its original position, and the compressed elastic member returns to its original position by restoring force, thereby making the blocking bar pass through the spokes of the wheel and enter the lock mode.

Below, an embodiment where the brake switching member is motorized will be described.

FIG. 9 schematically shows a motorized wheelchair brake system according to an embodiment.

Referring to FIG. 9, the brake switching member in this embodiment includes a sensing frame provided beneath the seat of the wheelchair, fixing and accommodating the second end of the cable therein, and having an electric driver electrically winding the cable to reverse the direction of the tension; and an upper plate coupling with the sensing frame, and having a pressure sensor 221 to sense whether a user sits down on the wheelchair.

The electric driver may include an electric pulley for winding the cable, a motor for providing torque to drive the electric pulley, and a driving controller for controlling the torque of the motor, and reverse a direction of winding the cable.

The driving controller controls the motor to turn the electric pulley in an opposite direction to the tension when the pressure sensor 221 installed in the upper plate senses that a user sits down on the wheelchair.

With this, the tension acting toward the brake is reversed, and thus the brake is released from the lock mode. Since detailed principles of locking and releasing the brake are the same as those of a mechanical brake, detailed descriptions will be omitted.

Then, if a sensed value of the pressure sensor is changed as a user stands up from the wheelchair, the driving controller returns the electric pulley to its original

position, thereby changing the direction of the tension again toward the brake and thus switching the brake over from the release mode to the lock mode.

Here, the sensing frame and the upper plate may be divided into a plurality of units so that the brake can be switched over between the release mode and the lock mode like the mechanical brake only when a user properly sits down on or stands up from the wheelchair.

Further, the electric driver may further include a sensor unit 230 such as an acceleration sensor and a tilt sensor.

With this sensor unit 230, the brake is not only simply switched over between the lock mode and the release mode, but also automatically actuated for safety when the wheelchair moves at an excessively high speed or on a slope.

In other words, if the sensor unit senses that the wheelchair moves at a high speed or on a downhill road, the brake is not fully switched over to the lock mode, but partially actuated to provide braking force, thereby decreasing the speed for safe movement.

Further, the acceleration sensor is additionally provided to sense the speed of the wheelchair, so that the electric pulley can be driven to actuate the brake if the sensed speed exceeds a specific speed (e.g. set within a range of 5~10km per hour).

Here, a locking level of the brake is adjusted in accordance with the exceeded speed, thereby controlling the actuation of the electric pulley and thus securing safe movement.

FIG. 10 schematically shows a brake according to an embodiment.

The brake may be variously classified into (a) a brake pad type, (b) a caliper type generally used for a baby carriage, (c) a rim brake type generally used for a bicycle, (d) a band brake type, etc. In case of a motorized brake system, the band brake type is recommended since it is easy to adjust the locking level of the brake.

FIG. 11 schematically shows that a switching member according to an embodiment is a safety device given in the form of a safety

bar or a seat belt, FIGs. 12 to 15 are detailed views of the safety bar provided as the switching member of FIG. 11, and FIGs. 16 to FIG. 18 are detailed views of the seat belt provided as the switching member of FIG. 11.

Referring to FIG. 11, the wheelchair brake system may be configured to release the brake only when the safety bar or the seat belt is fastened after a user sits down on the wheelchair.

The wheelchair brake system includes a brake 20 provided in a wheel of a wheelchair, and a brake actuation controller 10 connected to the brake 20 and locking and releasing the brake 20, in which the brake is usually in a lock mode but is released from the lock mode by the brake actuation controller 10 interlocking with the safety bar or the seat belt as the brake actuation controller 10 automatically senses that a user sits down on the wheelchair and fastens the safety bar or the seat belt.

The brake actuation controller 10 includes a connection member 110 connected to the brake, and a brake switching member 120 coupled to a second end of the connection member 110 and actuating the connection member 110 connected to the brake to release the brake when a user sits down on the wheelchair and fasten the safety device but return the connection member to its original positon to switch the brake over to the lock mode when a user unfasten the safety device.

In other words, the brake switching member 120 switches the brake over to a release mode by pressing the connection member and reversing the direction of the tension acting on the brake if a user fastens the safety device after sitting down on the wheelchair, but returns the connection member to its original position of applying the tension toward the brake with restoring force to switch the brake over to the lock mode if a user sitting down on the wheelchair unfastens the safety device.

In more detail, the connection member 110 may be achieved by a cable or string, the tension of which is adjustable, and the cable is set to give the tension to the brake so that the brake can keep the lock mode if no one sits down on the wheelchair. Here, the cable refers to a member made of a wire (or a string).

That is, the brake is usually locked since the cable is kept to give tension so that

lock mode.

Therefore, the brake is released only when a user sits down on the wheelchair and fastens the safety bar 121, and it is thus possible to further secure user safety.

FIG. 16 shows the wheelchair with the seat belt, in which the seat belt 122 serves as the brake switching member 120, and the brake keeps the lock mode since the tension of the cable acts toward the brake before fastening the seat belt 122.

The embodiment of FIG. 16 has the same principle as the embodiment of FIG. 11, and different in that the tension of the cable connected to the brake is changed in direction in accordance with whether the seat belt is fastened or not, so that the brake can be switched over between the lock mode and the release mode.

In FIGs. 16 and 17, the seat belt is achieved by a buckle, in which the cable connecting with the brake is positioned inside a fastening frame, i.e. a buckle inlet to which a buckle 122 is fastened, and thus the cable is pressed when the buckle 122 is coupled to the buckle inlet of the fastening frame in order to fasten the seat belt. As the cable is pressed, the tension acting toward the brake is reversed to thereby release the brake from the lock mode.

Here, the cable is coupled to the inside of the fastening frame through a plurality of pulleys, and thus pulled as much as inward displacement of the cable when the buckle 122 presses the cable, thereby reversing the tension acting toward the brake and releasing the brake. On the other hand, if the buckle 122 is separated from the fastening frame, the cable is returned to its original position and force of pulling the cable is removed, thereby returning the tension of the cable toward the brake and locking the brake.

FIG. 18 schematically shows a seat belt according to another embodiment.

Referring to FIG. 18, a guide member 123c for switching over the tension direction of the cable is provided inside a fastening frame 123b. As a buckle 123a is inserted in and fastened to the fastening frame 123b, the guide member 123c causes displacement of the cable and thus pulls the cable, thereby reversing the tension acting on the brake and releasing the brake from the lock mode.

In more detail, the guide member 123c includes two opposite guide grooves A and B respectively formed in front and rear sides thereof, and a moving member 1231 having a front projection C protruding above from the front guide groove A and a rear projection D protruding below from the rear guide groove B and coupling with the cable, which are formed as a single body so that the front projection and the rear projection can relatively move along the guide grooves, and mounted to the guide member.

The moving member 1231 rotates with respect to a rotary axis. The moving member has elasticity based on a spring so that the front projection can be set to be positioned by the elasticity on the top of the front guide groove. Therefore, the moving member 1231 returns to its original position by restoring force when the buckle 123 is unfastened even though it moves down in the front guide groove when the buckle 123a is fastened.

Here, the buckle 123a is provided to be inserted on the front side of the moving member. Therefore, if the buckle 123a is inserted in the fastening frame 123b, the buckle 123a is inserted pushing the front projection C down, and thus the front projection C moves down along the front guide groove A.

At this time, the rear projection D moving relative to the front projection C moves up along the rear guide groove B as the front projection C moves down.

Therefore, the cable coupling with the rear projection D moves upward and is thus pulled to reverse the tension of the cable acting toward the brake, thereby switching the brake over from the lock mode to the release mode.

On the other hand, if the buckle 123a is separated from the fastening frame 123b, the moving member 1231 returns to its original position by the restoring force of the spring, and the rear projection relatively moves and returns to its original position, thereby returning the direction of the tension of the cable toward the brake again and thus switching the brake over from the release mode to the lock mode.

FIGs. 19 to 21 schematically show a structure where a footrest is used as a switching member for the brake according to an embodiment.

In this embodiment referring to FIGs. 19 to 21, the footrest serves as the brake

If one footrest is opened, only the second control cable 118b is tensed to pull the cable connecting portion 711 so that the vertical flange coupling with the second the control cable 118b can be pulled as shown in (b) of FIG. 21, thereby rotating the first axis rotary gear unit 710 in the first axial direction.

As the first axis rotary gear unit 710 rotates, the second axis rotary gear unit also rotates in the second axial direction so that the first rotary bar 722 can rotate in the second axial direction as much as displacement. At this time, the first rotary bar 722 rotates and presses the second rotary bar 723, and thus the second rotary bar 723 is rotated to the brink of pressing the brake control unit 730.

In this state, no forces are transmitted to the brake control unit 730, and therefore the brake keeps the lock mode.

Then, if the other footrest is opened, the second rotary bar 723 of the other second axis rotary gear unit is further rotated by the same operation and presses the brake control unit 730, thereby rotating the brake control unit 730 in the first axial direction.

In more detail, the brake control unit 730 is formed on a central axis, and includes a brake guide bar 731 to which a brake cable 117 is connected. If the second rotary bar 723 rotates and presses the brake guide bar 731, the central axis of the brake control unit 730 rotates in the first axial direction and the tension of pulling the brake cable 117 down is generated, thereby reversing the direction of the tension acting toward the brake, pulling the brake cable in the direction opposite to the brake, and switching the brake from the lock mode to the release mode.

In result, the brake is released from the lock mode only when two footrests are all opened.

In this state, if even one of the footrests is folded, the brake guide bar 731 of the brake control unit returns to its original position by reverse action, so that the tension of the brake cable is changed in a direction toward the brake, thereby switching the brake over from the release mode to the lock mode.

The brake may be variously achieved by (a) the brake pad type, (b) the caliper type generally used for a baby carriage, (c) the rim

【CLAIMS】

【Claim 1】

A wheelchair brake system comprising:

a brake for a wheel of a wheelchair; and

a brake actuation controller for connecting with the brake and for locking and releasing the brake,

the wheelchair brake system being arranged for the brake to be usually in a lock mode, and for the brake actuation controller to control the brake to be switched over from the lock mode to a release mode if sensing that a user sits down on the wheelchair or the wheelchair is folded up;

wherein the brake actuation controller comprises:

a connection member which has a first end for elastically connecting with the brake, the connection member comprising a cable;

a non-motorized brake switching member for a second end of the connection member to be fixed thereto, and for actuating the connection member connecting with the brake to release the brake when the user sits down on the wheelchair, and for returning the connection member to switch the brake over to the lock mode when the user stands up from the wheelchair;

wherein the non-motorized brake switching member comprises:

a sensing frame for disposal beneath a seat of the wheelchair, and for accommodating the second end of the cable therein to be fixed and connected thereto; and

an upper plate for coupling with the sensing frame and for changing tension of the cable by pressing the cable accommodated in the sensing frame when the user sits down on the seat;

and wherein the upper plate comprises a cable accommodator;

the wheelchair brake system being arranged for the cable accommodator not to press the cable when no one sits down on the wheelchair, but for pressing the accommodated cable as the upper plate moves down when the user sits down on the wheelchair; and

for the brake to be released since the cable is tensed in a direction opposite to the brake when the cable is pressed.

【Claim 2】

The wheelchair brake system according to claim 1, wherein the sensing frame and the upper plate are arranged to be divided into a plurality of units;

at least one of cables for connecting to the respective units is for connection to the brake; and

the wheelchair brake system being arranged for the brake to be switched over from the lock mode to the release mode when at least one among the plurality of units is actuated.

【Claim 3】

A wheelchair brake system comprising:

a brake for a wheel of a wheelchair; and

a brake actuation controller for connecting with the brake and for locking and for releasing the brake,

the wheelchair brake system being arranged for

the brake to be usually in a lock mode, but the brake actuation controller to control the brake to be switched over from the lock mode to a release mode if sensing that a user sits down on the wheelchair and uses a safety device, in sync with the use of the safety device;

wherein the brake actuation controller comprises:

a connection member which has a first end for connecting with the brake;

a brake switching member for coupling with a second end of the connection member, for actuating the connection member connecting with the brake to release the brake only

when the user sits down on the wheelchair and for using the safety device, but for returning the connection member to switch the brake over to the lock mode again when the user eliminates the use of the safety device;

and wherein, if the safety device is a safety bar or a seat belt, the wheelchair brake system being arranged for:

the safety bar or the seat belt to serve as the brake switching member, and the brake to keep the lock mode since the tension of a cable acts toward the brake before the safety bar or the seat belt is fastened;

the cable provided inside the safety bar for pressing and for tensing in a direction opposite to the cable for changing the tension of the cable from a direction of the brake to an opposite direction so that the brake can be switched over from the lock mode to the release mode when the user sits down on the wheelchair and fastens the safety bar or the seat belt; and

the wheelchair brake system being arranged for the tension acting on the cable inside the safety bar to be removed and the tension of the cable to act toward the brake again so that the brake can be switched over from the release mode to the lock mode when the safety bar or the seat belt is unfastened.

【Claim 4】

The wheelchair brake system according to claim 3, wherein if the safety device is the seat belt,

the wheelchair brake system being arranged for the seat belt to be achieved by a buckle, in which the cable for connecting with the brake is positioned inside a fastening frame, i.e. a buckle inlet to which the buckle is fastened, the cable is pressed when the buckle is coupled to the buckle inlet of the fastening frame in order to fasten the seat belt, and the tension acting toward the brake is reversed to release the brake from the lock mode as the cable is pressed.

【Claim 5】

The wheelchair brake system according to claim 4, wherein the fastening frame comprises a guide member therein to change tension of the cable, and

the wheelchair brake system being arranged for the guide member to displace the cable and to generate pulling force, and to reverse tension of the cable so that the brake can be switched over from the lock mode to the release mode as the buckle is inserted in and fastened to the fastening frame.

【Claim 6】

The wheelchair brake system according to claim 5, wherein the guide member comprises two opposite guide grooves (A, B) respectively formed in front and rear sides thereof, and a moving member comprising a front projection C for protruding above from the front guide groove A and a rear projection D for protruding below from the rear guide groove B and for coupling with the cable, which are arranged to be formed as a single body for the front projection and the rear projection to relatively move along the guide grooves, and for mounting to the guide member.

【Claim 7】

The wheelchair brake system according to claim 6, wherein the moving member being for rotating with respect to a rotary axis, and the moving member arranged to have elasticity based on a spring so that the front projection can be set to be positioned by the elasticity on the top of the front guide groove, thereby returning the moving member to its original position by restoring force when the buckle is unfastened in a state that the front projection moves down in the front guide groove when the buckle is fastened;

the buckle to be provided to be inserted on the front

side of the moving member, and if the buckle is inserted in the fastening frame, the buckle to be inserted to push the front projection C down, for the front projection C to move down along the front guide groove A;

the rear projection D being for moving relative to the front projection C for moving up along the rear guide groove B as the front projection C moves down, so that the cable for coupling with the rear projection D can move upward and is thus pulled to reverse the tension of the cable acting toward the brake and for switching the brake over from the lock mode to the release mode;

if the buckle is separated from the fastening frame, the moving member is arranged to return to its original position by the restoring force of the spring, and the rear projection is arranged to relatively move and return to its original position, thereby returning the direction of the tension of the cable toward the brake again and thus switching the brake over from the release mode to the lock mode.