【CLAIMS】

【Claim 1】

A wheelchair brake system comprising:

a brake for a wheel of a wheelchair; and

a brake actuation controller which 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.

【Claim 2】

The wheelchair brake system according to claim 1, wherein the brake actuation controller comprises:

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

a 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 a 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.

【Claim 3】

The wheelchair brake system according to claim 2, wherein

the connection member comprises a cable or a bar;

the brake switching member is non-motorized or motorized for automatic actuation.

【Claim 4】

The wheelchair brake system according to claim 3, wherein the non-motorized brake switching member comprises:

a sensing frame for disposal beneath a seat of the wheelchair, and for accommodating a 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 a user sits down on the seat.

【Claim 5】

The wheelchair brake system according to claim 4, 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 a user sits down on the wheelchair; and

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

【Claim 6】

The wheelchair brake system according to claim 4, 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 is arranged to be switched over from the lock mode to the release mode when at least one among the plurality of units is actuated.

【Claim 7】

The wheelchair brake system according to claim 3, wherein the motorized brake switching member comprises:

a sensing frame for disposal beneath a seat of the

wheelchair, for accommodating a second end of the cable therein to be fixed and for connection thereto, and comprises an electric driver for electrically winding the cable to change tension; and

an upper plate which for coupling with the sensing frame and comprises a sensor for sensing whether a user sits down on the seat.

【Claim 8】

The wheelchair brake system according to claim 7, wherein

the electric driver comprises: an electric pulley for changing a winding direction of a cable, and 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

the electric driver for driving the motor to rotate the electric pulley for making tension act in an opposite direction of the brake and for releasing the brake when a pressure sensor provided in the upper plate senses that a user sits down on the wheelchair, but for driving the motor to rotate in an opposite direction for rotating and returning the electric pulley to its original position, for making the tension act toward the brake and for locking the

brake when the user stands up from the wheelchair.

【Claim 9】

The wheelchair brake system according to claim 8, wherein the electric driver further comprises a sensor unit such as an acceleration sensor and a tilt sensor, and

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

【Claim 10】

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.

【Claim 11】

The wheelchair brake system according to claim 10, 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 a 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.

【Claim 12】

The wheelchair brake system according to claim 11, wherein the safety device comprises one selected along a safety bar, a seat belt and a footrest.

【Claim 13】

The wheelchair brake system according to claim 12, wherein, if the safety device is the safety bar or the 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 the 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 a 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 14】

The wheelchair brake system according to claim 13, 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 a buckle 122

is fastened, 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, and the tension acting toward the brake is reversed to release the brake from the lock mode as the cable is pressed.

【Claim 15】

The wheelchair brake system according to claim 14, wherein the fastening frame comprises a guide member therein to change tension of a 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 16】

The wheelchair brake system according to claim 15, 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 17】

The wheelchair brake system according to claim 16, 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.

【Claim 18】

The wheelchair brake system according to claim 12, wherein, if the safety device is a footrest,

the wheelchair brake system being arranged for the footrest to serve as the brake switching member, and the brake to keep the lock mode since the tension of the cable acts toward the brake if the footrest is folded; and

the brake is arranged to be switched over from the lock mode to the release mode if a user sits down on the wheelchair and opens the footrest since the cable provided in the footrest is pressed and tensed in a direction

opposite to the cable and the tension of the cable is changed in the opposite direction to the brake.

【Claim 19】

The wheelchair brake system according to claim 12, wherein, if the safety device is a footrest,

the wheelchair brake system being arranged for the footrest to serve as the brake switching member, and a tension adjuster is further provided in between the footrest and the brake and for connecting with the cable;

the tension adjuster arranged to connect with the brake through the brake cable, and the footrest through the control cable; and

the tension adjuster comprises a guide rail arranged to be fixed beneath the seat, and a sliding member for moving along the guide rail and for having a first end for connecting with the control cable and a second end for connecting with the brake cable

【Claim 20】

The wheelchair brake system according to claim 19, wherein

the brake cable is arranged to tense in a direction toward the brake so that the brake can keep the lock mode

if the footrest is folded,

the brake cable is arranged to increase in length and tense in a direction opposite to the brake so that the control cable can be pressed and pulled if the footrest is opened, and

the brake is arranged to switch over from the lock mode to the release mode as the sliding member moves along the guide rail in a frontward direction of the wheelchair and thus the brake cable is also arranged to be pulled and the direction of the tension acting toward the brake is changed into the direction opposite to the brake.

【Claim 21】

The wheelchair brake system according to claim 12, wherein, if the safety device is a footrest,

the wheelchair brake system being arranged for the footrest to serve as the brake switching member, and a gear assembly is further provided in between the footrest and the brake and for connecting with the cable; and

the gear assembly comprises a first axis rotary gear unit for connecting with a control cable, a second axis rotary gear unit for engaging with the first axis rotary gear unit and for rotating with respect to a second axis, and a brake control unit for coupling with a brake cable

and for pressing the brake cable while rotating with respect to the first axis along the second axis rotary gear unit.

【Claim 22】

The wheelchair brake system according to claim 21, wherein

the first axis rotary gear unit comprises a cable connecting portion arranged to be formed at a first end with regard to an axis, for connecting with first and second control cables and for rotating in a first axial direction; and a first gear arranged to be formed at a second end, for engaging with the second axis rotary gear unit and for transmitting rotary force to the second axis rotary gear unit, in which two first axis rotary gear units are arranged to form a pair to couple with the respective footrests;

the second axis rotary gear unit comprises a second gear for engaging with the first gear and for rotating in a second axial direction; and a rotary bar arranged to be integrated with the second gear and for rotating in the second axial direction, in which two second axis rotary gear units are arranged to form a pair like the first axis rotary gear unit; and

two rotary bars of the second axis rotary gear units are arranged to be actuated as the footrests are opened in sequence, so that the brake control unit can be pressed and rotated only when all the footrests are opened.