{CLAIMS}

{Claim 1}

A mechanical-parking-lot control apparatus comprising:

an external control panel that is provided outside of a storage/removal door and that is used for performing an authentication operation of a user, a start-up operation of a mechanical parking lot, an opening/closing operation of the storage/removal door, and so forth;

a portable authentication medium that stores authentication information specific to the user and that allows the user to operate the external control panel when brought into an external authentication area formed in a limited area in the vicinity of the external control panel;

an external-authentication-area forming means that forms the external authentication area, detects the portable authentication medium brought into the external authentication area, and emits an external authentication signal on the basis of the authentication information specific to the portable authentication medium; and

a control means that permits the user to operate the external control panel, on the condition that the external authentication signal is being received.

{Claim 2}

A mechanical-parking-lot control apparatus according to

Claim 1, wherein the user authentication is automatically performed when the portable authentication medium is brought into the external authentication area and when the control means receives the external authentication signal.

{Claim 3}

A mechanical-parking-lot control apparatus according to Claim 1, further comprising:

a remote-authentication-area forming means that forms a remote authentication area in a location away from the storage/removal gateway, that detects the portable authentication medium brought into the remote authentication area, and that emits a remote authentication signal on the basis of the authentication information specific to the portable authentication medium,

wherein the user authentication is automatically performed when the portable authentication medium is brought into the remote authentication area and when the control means receives the remote authentication signal.

{Claim 4}

A mechanical-parking-lot control apparatus according to any one of Claims 1 to 3, further comprising:

an internal-authentication-area forming means that forms an internal authentication area in the interior of an entry

bay inside the storage/removal door,

wherein the internal-authentication-area forming means detects the portable authentication medium brought into the internal authentication area and emits an internal authentication signal; and

when the internal authentication signal is received, the control means performs control in such a way that the fact that the user is inside the entry bay and that the portable authentication medium is in the entry bay is displayed on the external control panel.

{Claim 5}

A mechanical-parking-lot control apparatus according to any one of Claims 1 to 4, further comprising:

an external sensing sensor that detects a person approaching the vicinity of the external control panel and the storage/removal gateway and that emits an external sensing signal to the control means; and

a warning means,

wherein, when the external sensing signal is received, the control means performs control in such a way that it is judged whether or not the portable authentication medium has been authenticated in the external authentication area, and, if not authenticated, a warning is issued by means of the warning means, and a management system of the mechanical

parking lot is also notified, on the condition that the reception of the external sensing signal continues for a predetermined amount of time or longer.

{Claim 6}

A mechanical-parking-lot control apparatus according to Claim 4, further comprising:

an internal sensing sensor that detects a person or a vehicle entering the entry bay and that emits an internal sensing signal to the control means; and

a warning means,

wherein, when the internal sensing signal is received, the control means judges whether or not the portable authentication medium has been authenticated in the internal authentication area;

if the portable authentication medium has not been authenticated in the internal authentication area, a warning is issued by means of the warning means, and the management system of the mechanical parking lot is also notified; and

if the portable authentication medium has been authenticated in the internal authentication area, a warning is issued by means of the warning means, and the management system of the mechanical parking lot is also notified, on the condition that the reception of the internal sensing signal continues for the predetermined amount of time or longer.

{Claim 7}

A mechanical-parking-lot control apparatus according to any one of Claims 1 to 6, wherein the portable authentication medium is provided with a remote controller function that enables remote control of the external control panel, on the condition that the portable authentication medium is recognized by the control means in the external authentication area.

{Claim 8}

A mechanical-parking-lot control method comprising:

first external authentication processing of authenticating a user upon recognizing that a portable authentication medium storing authentication information specific to the user is brought into a predetermined authentication area;

transport retrieval processing of, on the condition that the first external authentication processing has been completed, automatically retrieving a predetermined vehicle transporter to an entry bay inside the storage/removal door, or retrieving the vehicle transporter via the user performing a start-up operation at an external control panel provided outside the storage/removal door;

second external authentication processing of, after the

vehicle transporter has arrived at the entry bay, recognizing that the portable authentication medium is in an external authentication area formed in a limited area in the vicinity of the external control panel;

first verification processing of judging whether or not the portable authentication medium separately authenticated in the first and the second external authentication processing is the same;

door-opening processing of, on the condition that the first verification processing results in an affirmative judgment, automatically opening the storage/removal door, or of opening the storage/removal door via the user performing a door-opening operation at the external control panel;

third external authentication processing of recognizing again that the portable authentication medium is in the external authentication area after the user finishes storing/removing a vehicle;

second verification processing of judging whether or not the portable authentication medium recognized in the third external authentication processing is the same as the one recognized in the first and second external authentication processing; and

door-closing processing of permitting the user to perform a door-closing operation at the external control panel, on the condition that the second verification processing results in

an affirmative judgment and also that the portable authentication medium is in the external authentication area until the storage/removal door is closed completely.

{Claim 9}

A mechanical-parking-lot control method according to Claim 8, wherein the predetermined authentication area is the external authentication area.

{Claim 10}

A mechanical-parking-lot control method according to Claim 8, wherein the predetermined authentication area is a remote authentication area formed at a location away from the storage/removal gateway.

{Claim 11}

A mechanical-parking-lot control method according to any one of Claims 8 to 10, further comprising:

internal authentication processing of, after the door-opening processing, recognizing that the same portable authentication medium as the one authenticated in the first and second external authentication processing is brought into an internal authentication area formed inside the entry bay; and

internal-presence display processing of displaying the

fact that the user is in the entry bay and that the portable authentication medium is in the entry bay on the external control panel.

{Claim 12}

A mechanical-parking-lot control method according to any one of Claims 8 to 11, further comprising:

unauthorized-person-approach warning processing of, in the case in which an external sensing signal emitted from an external sensing sensor that detects a person approaching the vicinity of the external control panel is received, and the portable authentication medium also has not been authenticated in the external authentication area, issuing a warning by means of a warning means, on the condition that the reception of the external sensing signal continues for a predetermined amount of time or longer, and also of notifying a management system of the mechanical parking lot.

{Claim 13}

A mechanical-parking-lot control method according to any one of Claims 8 to 12, further comprising:

unauthorized-person-intrusion warning processing of, in the case in which an internal sensing signal emitted from an internal sensing sensor that detects a person or a vehicle entering the entry bay is received, and, additionally, the

portable authentication medium has not been authenticated in the internal authentication area, issuing a warning by means of the warning means and also of notifying a management system of the mechanical parking lot; and

user-state-confirmation warning processing of, in the case in which the internal sensing signal is received, and, additionally, the portable authentication medium has been authenticated in the internal authentication area, issuing a warning by means of the warning means, on the condition that the reception of the internal sensing signal continues for a predetermined amount of time or longer, and also of notifying the management system of the mechanical parking lot.

{Claim 14}

A mechanical-parking-lot control method according to any one of Claims 8 to 13, further comprising:

reservation processing of, in the case in which a second user carrying a portable authentication medium arrives and is standing by while a first user is performing an storing/removing operation, making a storage/removal reservation by judging whether this standby user is requesting store a vehicle or requesting to remove a vehicle on the basis of authentication information in the portable authentication medium, at the point in time when the portable authentication medium carried by the standby user is brought into the

external authentication area.

{Claim 15}

A mechanical-parking-lot control method according to Claim 14, further comprising:

rearranging processing of, to the extent possible, replacing the vehicle transporter planned to be transported for the standby user to a position from which the vehicle transporter is most easily transported after the reservation processing, while the first user storing/removing a vehicle.

{Claim 16}

A mechanical parking lot controlled by a control method according to any one of Claims 8 to 15.

CLAIMS:

{Claim 1}

A mechanical-parking-lot control apparatus comprising:

an external control panel that is provided outside of a storage/removal door and that performs an authentication operation of a user, a start-up operation of a mechanical parking lot, an opening/closing operation of the storage/removal door, and so forth;

a portable authentication medium that stores authentication information specific to the user and that allows the user to operate the external control panel when brought into an external authentication area formed in a limited area in the vicinity of the external control panel;

an external-authentication-area forming means that forms the external authentication area, detects the portable authentication medium brought into the external authentication area, and emits an external authentication signal on the basis of the authentication information specific to the portable authentication medium; and

a control means that permits the user to operate the external control panel, on the condition that the external authentication signal is being received.

{Claim 2}

A mechanical-parking-lot control apparatus according to Claim 1, wherein the user authentication is automatically performed when the portable authentication medium is brought into the external authentication area and when the control means receives the external authentication signal.

{Claim 3}

A mechanical-parking-lot control apparatus according to Claim 1, further comprising:

a remote-authentication-area forming means that forms a remote authentication area in a location away from a storage/removal gateway, that detects the portable authentication medium brought into the remote authentication area, and that emits a remote authentication signal on the basis of the authentication information specific to the portable authentication medium,

wherein the user authentication is automatically performed when the portable authentication medium is brought into the remote authentication area and when the control means receives the remote authentication signal.

{Claim 4}

A mechanical-parking-lot control apparatus according to Claim 1, further comprising:

an internal-authentication-area forming means that forms

an internal authentication area in the interior of an entry bay inside the storage/removal door,

wherein the internal-authentication-area forming means detects the portable authentication medium brought into the internal authentication area and emits an internal authentication signal; and

when the internal authentication signal is received, the control means performs control in such a way that the fact that the user is inside the entry bay and that the portable authentication medium is in the entry bay is displayed on the external control panel.

{Claim 5}

A mechanical-parking-lot control apparatus according to Claim 1, further comprising:

an external sensing sensor that detects a person approaching the vicinity of the external control panel and a storage/removal gateway and that emits an external sensing signal to the control means; and

a warning means,

wherein, when the external sensing signal is received, the control means performs control in such a way that it is judged whether or not the portable authentication medium has been authenticated in the external authentication area, and, if not authenticated, a warning is issued by means of the

warning means, and a management system of the mechanical parking lot is also notified, on the condition that the reception of the external sensing signal continues for a predetermined amount of time or longer.

{Claim 6}

A mechanical-parking-lot control apparatus according to Claim 4, further comprising:

an internal sensing sensor that detects a person or a vehicle entering the entry bay and that emits an internal sensing signal to the control means; and

a warning means,

wherein, when the internal sensing signal is received, the control means performs control in such a way that it is judged whether or not the portable authentication medium has been authenticated in the internal authentication area;

if the portable authentication medium has not been authenticated in the internal authentication area, a warning is issued by means of the warning means, and a management system of the mechanical parking lot is also notified; and

if the portable authentication medium has been authenticated in the internal authentication area, a warning is issued by means of the warning means, and the management system of the mechanical parking lot is also notified, on the condition that the reception of the internal sensing signal

continues for the predetermined amount of time or longer.

{Claim 7}

A mechanical-parking-lot control apparatus according to Claim 1, wherein the portable authentication medium is provided with a remote controller function that enables remote control of the external control panel, on the condition that the portable authentication medium is recognized by the control means in the external authentication area.

{Claim 8}

A mechanical-parking-lot control method comprising:

first external authentication processing of authenticating a user upon recognizing that a portable authentication medium storing authentication information specific to the user is brought into a predetermined authentication area;

transport retrieval processing of, on the condition that the first external authentication processing has been completed, automatically retrieving a predetermined vehicle transporter to an entry bay inside a storage/removal door, or retrieving the vehicle transporter via the user performing a start-up operation at an external control panel provided outside the storage/removal door;

second external authentication processing of, after the

vehicle transporter has arrived at the entry bay, recognizing that the portable authentication medium is in an external authentication area formed in a limited area in the vicinity of the external control panel;

first verification processing of judging whether or not the portable authentication medium separately authenticated in the first and the second external authentication processing is the same;

door-opening processing of, on the condition that the first verification processing results in an affirmative judgment, automatically opening the storage/removal door, or of opening the storage/removal door via the user performing a door-opening operation at the external control panel;

third external authentication processing of recognizing again that the portable authentication medium is in the external authentication area after the user finishes storing/removing a vehicle;

second verification processing of judging whether or not the portable authentication medium recognized in the third external authentication processing is the same as the one recognized in the first and second external authentication processing; and

door-closing processing of permitting the user to perform a door-closing operation at the external control panel, on the condition that the second verification processing results in

an affirmative judgment and also that the portable authentication medium is in the external authentication area until the storage/removal door is closed completely.

{Claim 9}

A mechanical-parking-lot control method according to Claim 8, wherein the predetermined authentication area is the external authentication area.

{Claim 10}

A mechanical-parking-lot control method according to Claim 8, wherein the predetermined authentication area is a remote authentication area formed at a location away from a storage/removal gateway.

{Claim 11}

A mechanical-parking-lot control method according to Claim 8, further comprising:

internal authentication processing of, after the door-opening processing, recognizing that the same portable authentication medium as the one authenticated in the first and second external authentication processing is brought into an internal authentication area formed inside the entry bay; and

internal-presence display processing of displaying the

fact that the user is in the entry bay and that the portable authentication medium is in the entry bay on the external control panel.

{Claim 12}

A mechanical-parking-lot control method according to Claim 8, further comprising:

unauthorized-person-approach warning processing of, in the case in which an external sensing signal emitted from an external sensing sensor that detects a person approaching the vicinity of the external control panel is received, and the portable authentication medium also has not been authenticated in the external authentication area, issuing a warning by means of a warning means, on the condition that the reception of the external sensing signal continues for a predetermined amount of time or longer, and also of notifying a management system of the mechanical parking lot.

{Claim 13}

A mechanical-parking-lot control method according to Claim 8, further comprising:

unauthorized-person-intrusion warning processing of, in the case in which an internal sensing signal emitted from an internal sensing sensor that detects a person or a vehicle entering the entry bay is received, and, additionally, the

portable authentication medium has not been authenticated in the internal authentication area, issuing a warning by means of the warning means and also of notifying a management system of the mechanical parking lot; and

user-state-confirmation warning processing of, in the case in which the internal sensing signal is received, and, additionally, the portable authentication medium has been authenticated in the internal authentication area, issuing a warning by means of the warning means, on the condition that the reception of the internal sensing signal continues for a predetermined amount of time or longer, and also of notifying the management system of the mechanical parking lot.

{Claim 14}

A mechanical-parking-lot control method according to Claim 8, further comprising:

reservation processing of, in the case in which a second user carrying the portable authentication medium arrives and is standing by while a first user is performing an storing/removing operation, making a storage/removal reservation by judging whether this standby user is requesting store a vehicle or requesting to remove a vehicle on the basis of authentication information in the portable authentication medium, at the point in time when the portable authentication medium carried by the standby user is brought into the

external authentication area.

{Claim 15}

A mechanical-parking-lot control method according to Claim 14, further comprising:

rearranging processing of, to the extent possible, replacing the vehicle transporter planned to be transported for the standby user to a position from which the vehicle transporter is most easily transported after the reservation processing, while the first user storing/removing a vehicle.

{Claim 16}

A mechanical parking lot controlled by a control method according to Claim 8.