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LOCKER APPARATUS

Abstract

In a locker apparatus, an operation unit includes authentication means, and a control device locks a locking device in order to bring a door into a closed state except when luggage is deposited in a box and when the luggage is taken out from the box. The operation unit includes a reopening door button for giving an instruction to reopen the door. When the reopening door button is operated within 15 minutes after the luggage is deposited in the box, the door is closed, and the locking device is locked once, the control device unlocks the locking device, on a condition that authentication by the authentication means is established, in order to permit the door to be reopened, and locks the locking device again when the door is closed thereafter.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is based upon and claims the benefit of priority from the prior Japanese Patent Application No. 2024-018011, filed Feb. 8, 2024, the entire contents of which are incorporated herein by reference.

BACKGROUND

Technical Field

[0002] The technique disclosed in this specification relates to a locker apparatus that includes a box capable of accommodating luggage therein, a door for opening and closing the box, and a locking device for unlockably locking the door.

Related Art

[0003] Conventionally, as this type of technique, for example, the techniques described in Japanese Utility Model Registration No. 3113126 (JP3113126U), Japanese Utility Model Registration No. 3113263 (JP3113263U), and Japanese Utility Model Registration No. 3220448 (JP3220448U) have been known. JP3113126U, JP3113263U, and JP3220448U each describe technique related to a normally closed-type coin locker that provisionally locks each door at all times when not in use.

[0004] Generally, conventional coin lockers are normally opened-type coin lockers in which each door is not locked when no luggage is deposited therein. Therefore, rubbish is sometimes thrown into boxes, or the boxes are sometimes used as luggage storage areas without permission, so that there are problems in terms of hygiene and crime prevention, and installation companies are forced to manage and handle these problems. In contrast, in each of the normally closed-type coin lockers described in JP3113126U, JP3113263U, and JP3220448U, each door is provisionally locked even when no luggage is deposited therein, which can reduce the burden of the above management and handling.

[0005] In recent years, as normally closed-type coin lockers, a type of locker apparatus in which a locking device is electrically activated and operated to be locked and unlocked without using a physical key, has become the mainstream. For example, a user checks an available box by a number at an operation unit provided in a locker apparatus, designates the number, and performs a payment operation for a usage fee. JP3113126U and JP3113263U each describe a payment method by cash, and JP3220448U describes a payment method by a credit card or the like. When the locker apparatus confirms payment of the usage fee in response to this payment operation, the locking device of the designated box is unlocked, the door opens, and it becomes possible to deposit luggage. When the user deposits luggage, closes the door, and confirms the operation, the locking device is locked. When the luggage is deposited as described above, a note on which the number of the designated box is recorded is issued to the user for convenience in taking out the luggage. For example, JP3113126U and JP3113263U each state that in depositing luggage, a receipt with a bar code is issued as a note from the locker apparatus, and in taking out the luggage, the user is authenticated by holding the issued receipt over a bar code reader, the locking device of the designated box is unlocked, and the door is opened. Meanwhile, JP3220448U states that by using a two-dimensional code such as a serial number code, a bar code, or a QR code (registered trademark) instead of a receipt, the user is authenticated and the locking device is unlocked.

SUMMARY

Technical Problems

[0006] In each of the normally closed-type locker apparatuses described in JP3113126U, JP3113263U, and JP3220448U, when the user deposits luggage in the box and the door is closed, the locking device is locked and the door is locked into a closed state. At this time, for example, the user may wish to take out luggage or the like unintentionally left in the box, or may wish to redeposit other luggage. In this case, the user has to unlock the locking device of the box in which the luggage has already been deposited, and open the door again. In this case, in the conventional normally closed-type locker apparatus, it is necessary to perform an operation for taking out the luggage on an operation unit.

[0007] However, in the conventional normally closed-type locker apparatus, in order to close and lock the door again after luggage is taken out, it is necessary to perform an operation for depositing luggage again, which forces the user to pay a usage fee again. In this case, if it is immediately after depositing the luggage, this does not mean that the box has actually stored the luggage therein. For the convenience of users, it is therefore desirable to provide a locker apparatus that allows a door of a box to be reopened once without having to pay a usage fee again.

[0008] The disclosed technique has been made in view of the above circumstances, and an object of the disclosed technique is to provide a locker apparatus that allows a user to redeposit luggage immediately after completing an operation for depositing luggage, without forcing the user to bear the burden of a new usage fee.

Means of Solving the Problems

[0009] (1) In order to achieve the above object, one aspect of the disclosed technique is directed to a locker apparatus including: a box capable of accommodating luggage therein; a door configured to open and close the box; a locking device configured to unlockably lock the door; an operation unit configured to receive an operation by a user; and a control device configured to control the locking device in response to an operation on the operation unit by the user, wherein the operation unit includes authentication member configured to authenticate the user, the control device is configured to lock the locking device in order to lock the door into a closed state except when the luggage is deposited in the box and when the luggage is taken out from the box, the operation unit includes a reopening door button that can be operated by the user in order to give an instruction to reopen the door, and when the reopening door button is operated within a predetermined time after the luggage is deposited in the box, the door is closed, and the locking device is locked once, the control device unlocks the locking device, on a condition that authentication of the user by the authentication member is established, in order to permit the door to be reopened, and locks the locking device again when the door is closed thereafter.

[0010] According to the above configuration (1), on a condition that the reopening door button is operated within the predetermined time after the luggage is deposited in the box, the door is closed, and the locking device is locked once, and authentication of the user by the authentication member is established, the locking device is unlocked in order to permit the door to be reopened, and when the door is closed thereafter, the locking device is locked again. Therefore, for example, when the user takes out unintentionally left luggage or the like or redeposits the luggage immediately after depositing the luggage, reopening of the door by unlocking and locking after the door is closed again are performed, without paying a usage fee, on the condition that the reopening door button is operated within the predetermined time and authentication of the user is established.

[0011] (2) In order to achieve the above object, according to the above configuration (1), preferably: the operation unit includes a display unit configured to display at least one of a virtual button, an illustration of a locker apparatus, and a text; the control device is configured to cause a screen of the display unit to sequentially transition from a standby screen in response to an operation on the virtual button by the user; as the virtual button, a deposit button that is operated by the user when the user deposits the luggage in the box, a take-out button that is operated by the user

when the user takes out the luggage from the box, and the reopening door button are displayed on the standby screen; the reopening door button is a button that is operated by the user particularly when the user redeposits the luggage in the box, not when the user takes out the luggage from the box; and on the standby screen, the deposit button and the take-out button are displayed side by side, and the reopening door button is placed adjacent to an upper side of the take-out button and is smaller in size than the take-out button.

[0012] According to the above configuration (2), in addition to the action of the above configuration (1), on the standby screen, the deposit button and the take-out button as the virtual buttons are displayed side by side, and the reopening door button is placed adjacent to the upper side of the take-out button and is smaller in size than the take-out button. Here, the deposit button which is frequently used is used for an operation in depositing the luggage, and the take-out button which is frequently used is used for an operation in taking out the luggage, so that the uses of the deposit button and the take-out button are different from each other, and there is little risk of selecting a wrong button at the time of operation. In contrast, although the reopening door button is used less frequently, the reopening door button is used for an operation in redepositing the luggage, and the use thereof is similar to that of the take-out button, so that there is a risk of selecting a wrong button from the reopening door button and the take-out button at the time of operation. With the above configuration, since the reopening door button is placed adjacent to the upper side of the take-out button and is smaller in size than the take-out button, the take-out button is more conspicuous than the reopening door button and is easily distinguished from the reopening door button, so that there is less risk of selecting a wrong button when operating one of these buttons.

[0013] (3) In order to achieve the above object, in the above configuration (2), preferably, when the reopening door button is operated, the control device causes a display of the display unit to transition from the standby screen to a confirmation screen, and an explanation text “You can redeposit luggage within a predetermined time after deposit”, an elapsed time after the deposit, and a confirmation button as the virtual button are displayed on the confirmation screen.

[0014] According to the above configuration (3), in addition to the action of the above configuration (2), when the reopening door button is operated, the display of the display unit transitions from the standby screen to the confirmation screen, and an explanation text “You can redeposit luggage within a predetermined time after deposit”, and the elapsed time after the deposit are displayed on this confirmation screen. Therefore, the user can check the content of the selected operation and the remaining time for which the operation is possible.

[0015] (4) In order to achieve the above object, in the above configuration (3), preferably, when the confirmation button is operated, the control device causes the display of the display unit to transition from the confirmation screen to an authentication selection screen, and a text “Redeposit luggage” and a plurality of types of authentication buttons for selecting one of a plurality of authentication methods are displayed on the authentication selection screen.

[0016] According to the above configuration (4), in addition to the action of the above configuration (3), when the confirmation button is operated, the display of the display unit transitions from the confirmation screen to the authentication selection screen, and a text “Redeposit luggage” is displayed on the authentication selection screen, so that the user can confirm that the user has shifted to an operation such as redeposit of the luggage, rather than take-out of the luggage. In addition, since the plurality of types of authentication buttons for selecting one of the plurality of authentication methods are displayed, the user's operation for entering an authentication method is simplified.

[0017] (5) In order to achieve the above object, in the above configuration (4), preferably, when one of the authentication buttons is operated, the control device causes the display of the display unit to transition from the authentication selection screen to an authentication execution screen, and the authentication member or an illustration prompting an operation on the authentication member corresponding to the selected one authentication method, and an explanation text therefor are

displayed on the authentication execution screen.
[0018] According to the above configuration (5), in addition to the action of the above configuration (4), when one of the authentication buttons is operated, the display of the display unit transitions from the authentication selection screen to the authentication execution screen, and the authentication member or the illustration prompting an operation on the authentication member corresponding to the selected one authentication method and the explanation text therefor are displayed on the authentication execution screen, so that it becomes easier for the user to perform the operation for performing authentication.
[0019] (6) In order to achieve the above object, in the above configuration (5), preferably, the door is provided with operation member that is operated by the user in order to request the locking device to lock when the user has deposited the luggage in the box and has closed the door; when the authentication member is operated, the control device causes the display of the display unit to transition from the authentication execution screen to a box selection screen; and a number corresponding to the box in which the user has deposited the luggage, a selection button that can be operated in order to select the number, an explanation text prompting an operation on the operation member after the luggage is deposited again, and an illustration for the operation on the operation member are displayed on the box selection screen.
[0020] According to the above configuration (6), in addition to the action of the above configuration (5), when the authentication member is operated, the display of the display unit transitions from the authentication execution screen to the box selection screen, and the number corresponding to the box in which the user has deposited the luggage and the selection button that can be operated to select this number are displayed on the box selection screen, so that it becomes easier for the user to select the box in which the user has deposited the luggage. In addition, since the operation that should be performed by the user on the operation member after the user deposits the luggage again (redeposits the luggage) is prompted with an illustration, the user is prevented from forgetting to operate the operation member, and is prevented from forgetting to close and lock the door.
[0021] (7) In order to achieve the above object, in the above configuration (6), preferably, when the operation member is operated, the control device causes the display of the display unit to transition from the box selection screen to an end screen, and a text “Thank you for using our service” is displayed on the end screen.
[0022] According to the above configuration (7), in addition to the action of the above configuration (6), when the operation member is operated, the display of the display unit transitions from the box selection screen to the end screen, and the text “Thank you for using our service” is displayed on the end screen, so that the user is notified of the end of redeposit of the luggage.
[0023] (8) In order to achieve the above object, in the above configuration (1) or (3) above, preferably, the predetermined time for permitting the door to be reopened is 15 minutes after the locking device is locked once.
[0024] According to the above configuration (8), in addition to the action of the above configuration (1) or (3), the 15-minute period can be a sufficient time for taking out luggage, etc., left behind and for redepositing luggage.
[0025] (9) In order to achieve the above object, in the above configuration in (1) or (3), preferably, the control device is configured to permit the door to be reopened multiple times within the predetermined time.
[0026] According to the above configuration (9), in addition to the action of the above configuration (1) or (3), since the door is permitted to be reopened multiple times within the predetermined time, it is possible to redeposit the luggage multiple times as needed by the user.
[0027] (10) In order to achieve the above object, in the above configuration (1) or (6), preferably, if there are a plurality of the boxes in which the luggage has been deposited by the same user, the control device unlocks the locking device corresponding to only the box selected through an

operation on the operation unit.
[0028] According to the above configuration (10), in addition to the action of the above configuration (1) or (6), if there are a plurality of the boxes in which the same user has deposited the luggage, by selecting a target box through an operation on the operation unit, the locking device corresponding to only the selected box is unlocked, so that it is possible to limit redeposit of the luggage to only the specific box.
[0029] According to the above configuration (1), immediately after the operation for depositing the luggage is completed, redeposit of the luggage, etc., can be performed without forcing the user to bear the burden of a new usage fee.
[0030] According to the above configuration (2), in addition to the effect of the above configuration (1), it is possible to reduce a situation in which the user selects and operates a wrong one out of the reopening door button and the take-out button and performs operation from the beginning.
[0031] According to the above configuration (3), in addition to the effect of the above configuration (2), after the reopening door button is operated, the user can be prompted to complete redeposit of the luggage or the like within the predetermined time, so that it is possible to reduce a mistake of the user trying to continue operation.
[0032] According to the above configuration (4), in addition to the effect of the above configuration (3), after operating the confirmation button, the user can select an authentication method in a short time.
[0033] According to the above configuration (5), in addition to the effect of the above configuration (4), after operating the authentication buttons, the user can perform authentication in a short time.
[0034] According to the above configuration (6), in addition to the effect of the above configuration (5), the user can specify the box in which the user is to redeposit the luggage, in a short time, and can more assuredly lock the door of this box after redepositing the luggage.
[0035] According to the above configuration (7), in addition to the effect of the above configuration (6), the user can confirm the completion of the operation for redepositing the luggage.
[0036] According to the above configuration (8), in addition to the effect of the above configuration (1) or (3), it is possible to provide the user of the locker apparatus with a convenience that is effective in terms of time.
[0037] According to the above configuration (9), in addition to the effect of the above configuration (1) or (3), it is possible to provide the user of the locker apparatus with a convenience that is effective in terms of the number of times.
[0038] According to the above configuration (10), in addition to the effect of the above configuration (1) or (6), it is possible to provide the user of the locker apparatus with an effective convenience without any loss of operation.

Description

BRIEF DESCRIPTION OF THE DRAWINGS
[0039] FIG. **1** is a front view showing a locker apparatus according to a first embodiment;
[0040] FIG. **2** is a block diagram showing the electrical configuration of the locker apparatus according to the first embodiment;
[0041] FIG. **3** shows a standby screen displayed on a display unit when a reopening door mode is executed, according to the first embodiment;
[0042] FIG. **4** shows a confirmation screen displayed on the display unit when the reopening door mode is executed, according to the first embodiment;
[0043] FIG. **5** shows an authentication selection screen displayed on the display unit when the reopening door mode is executed, according to the first embodiment;
[0044] FIG. **6** shows an authentication execution screen displayed on the display unit when the

reopening door mode is executed, according to the first embodiment;
[0045] FIG. **7** shows an authentication execution screen displayed on the display unit when the reopening door mode is executed, according to the first embodiment;
[0046] FIG. **8** shows an authentication execution screen displayed on the display unit when the reopening door mode is executed, according to the first embodiment;
[0047] FIG. **9** shows a box selection screen displayed on the display unit when the reopening door mode is executed, according to the first embodiment;
[0048] FIG. **10** shows a box selection screen displayed on the display unit when the reopening door mode is executed, according to the first embodiment;
[0049] FIG. **11** shows an end screen displayed on the display unit when the reopening door mode is executed, according to the first embodiment;
[0050] FIG. **12** shows an authentication selection screen displayed on the display unit when a user taps a take-out button by mistake instead of a reopening door button, according to the first embodiment;
[0051] FIG. **13** shows an authentication execution screen displayed on the display unit when the user taps the take-out button by mistake instead of the reopening door button, according to the first embodiment;
[0052] FIG. **14** shows an authentication execution screen displayed on the display unit when the user taps the take-out button by mistake instead of the reopening door button, according to the first embodiment;
[0053] FIG. **15** shows an authentication execution screen displayed on the display unit when the user taps the take-out button by mistake instead of the reopening door button, according to the first embodiment;
[0054] FIG. **16** shows a box selection screen displayed on the display unit when a luggage take-out mode is executed, according to the first embodiment;
[0055] FIG. **17** shows a take-out confirmation screen displayed on the display unit when the user taps the take-out button by mistake instead of the reopening door button, according to the first embodiment;
[0056] FIG. **18** shows a redeposit confirmation screen displayed on the display unit when the user taps the take-out button by mistake instead of the reopening door button, according to the first embodiment;
[0057] FIG. **19** shows a box unlocking screen displayed on the display unit when the user taps the take-out button by mistake instead of the reopening door button, according to the first embodiment;
[0058] FIG. **20** shows an end screen displayed on the display unit when the user taps the take-out button by mistake instead of the reopening door button, according to the first embodiment;
[0059] FIG. **21** shows a first warning screen displayed on the display unit when the user taps the take-out button by mistake instead of the reopening door button, according to the first embodiment;
[0060] FIG. **22** shows a second warning screen displayed on the display unit when the user taps the take-out button by mistake instead of the reopening door button, according to the first embodiment;
[0061] FIG. **23** shows a box unlocking screen displayed on the display unit when the user taps the take-out button by mistake instead of the reopening door button, according to the first embodiment;
[0062] FIG. **24** shows an end screen displayed on the display unit when the user taps the take-out button by mistake instead of the reopening door button, according to the first embodiment;
[0063] FIG. **25** shows a standby screen displayed on a display unit when a reopening door mode is executed, according to a second embodiment; and
[0064] FIG. **26** shows a reopening door confirmation screen displayed on the display unit when the reopening door mode is executed, according to the second embodiment.

DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENTS

[0065] Hereinafter, embodiments in which the locker apparatus of the disclosed technique is embodied will be described in detail with reference to the drawings.

First Embodiment

[0066] First, a first embodiment will be described.

Outline of Configuration of Locker Apparatus

[0067] FIG. **1** shows a locker apparatus **1** in a front view. FIG. **2** shows the electrical configuration of the locker apparatus **1** in a block diagram. The locker apparatus **1** of this embodiment is installed on the premises of a railroad station and used to temporarily deposit and keep luggage, for example.

[0068] As shown in FIG. **1**, the locker apparatus **1** includes a housing **10**, a plurality of boxes **11** that are capable of accommodating luggage in the housing **10**, an operation unit **20** for receiving an operation by a user in order for the user to place or take out luggage in or from a box **11**, and a control device **30** that controls opening/closing, locking/unlocking, etc., of each box **11** and display, etc., of the operation unit **20** in response to operations on the operation unit **20** by the user.

Configuration of Boxes

[0069] As shown in FIG. **1**, the locker apparatus **1** includes the plurality of boxes **11** each capable of accommodating luggage of the user therein. Specifically, as shown in FIG. **1**, the locker apparatus **1** schematically includes a total of 24 boxes **11** in 2 rows×12 columns, and the two rightmost columns on the upper row and the rightmost one column on the lower row in FIG. **1** include a plurality of small boxes **11***a* each having a small frontage. The numbers of boxes **11** and small boxes **11***a* of this embodiment are merely an example, and can be increased or decreased as necessary. In addition, the locker apparatus **1** of this embodiment includes the plurality of boxes **11** and small boxes **11***a* having different frontages as shown in FIG. **1**, but all of the plurality of boxes can also be configured with the same frontage.

[0070] At the front opening of each box **11** or **11***a*, a door **12** that can be opened and closed independently for each box **11** or **11***a* is provided. A box number (0001 to 0031) is attached to the surface of each door **12** to specify the corresponding box **11** or **11***a*. In this embodiment, each door **12** is, for example, a left-opening door that opens to the left of the box **11** or **11***a* in the drawing, but may also be a right-opening door that opens to the right of the box **11** or **11***a* in the drawing. A locking device **13** (see FIG. **2**) described later is provided inside each box **11** or **11***a*. In this embodiment, the description of the specific configuration of the locking device **13** is omitted.

[0071] The door **12** of each box **11** or **11***a* is provided with a lever **14** that is operated by the user in order to request the locking device **13** to lock when the user has deposited luggage in the box **11** or **11***a* and has closed the door **12**. In FIG. **1**, for convenience, the levers **14** are shown only on the doors **12** with door numbers of “0001” and “0002”, but not shown on the other doors **12**. The levers **14** correspond to an example of “operation member” of the disclosed technique.

Configuration of Operation Unit

[0072] As shown in FIG. **1**, the operation unit **20** includes a camera **21** for recognizing users, a display unit **22** with a liquid crystal screen for exchanging information with users, a QR code reader **23** for reading data such as QR codes (registered trademark) from users, a settlement terminal **24** that can read IC tags incorporated into cash cards, and a printer **26** for printing a receipt or the like for proof of use. Data input from users can be performed using the QR code reader **23** and the settlement terminal **24**. Here, a cash card is, for example, a card that allows settlement of electronic money, such as a transportation IC card. The display unit **22**, the QR code reader **23**, and the settlement terminal **24** of the operation unit **20** correspond to an example of “authentication member” of the disclosed technique. The display unit **22** is configured to display at least one of a virtual button, an illustration of a locker apparatus, and a text, as described later.

Configuration of Control Device

[0073] The control device **30** is provided inside the operation unit **20**, and is configured to control the locking device **13** of each box **11** or **11***a* in response to an operation on the operation unit **20** by the user. As shown in FIG. **2**, the control device **30** includes a CPU **31** and a memory **32**. For example, a deposit program **32***a* for performing control when luggage is to be deposited in a box **11**

or **11***a* and a take-out program **32***b* for performing control when luggage is to be taken out from a box **11** or **11***a* are stored in the memory **32**. The control device **30** is electrically connected to each locking device **13**, each lever **14**, and the operation unit **20**, and is configured to perform control of each locking device **13**, screen display of the display unit **22**, etc., based on the deposit program **32***a* or the take-out program **32***b*. In FIG. **2**, only one locking device **13** is shown for convenience, but in actuality, locking devices **13** whose number is equal to the number of boxes **11** and **11***a* are connected to the control device **30**. In addition, a communication unit **50** is connected to the control device **30**, and the locker apparatus **1** is capable of communicating with a management apparatus (not shown) via the communication unit **50**. The management apparatus is an apparatus that is installed on the premises of a station or any other predetermined location and is higher in rank than the locker apparatus **1**.

[0074] The control device **30** is configured to automatically open and close the door **12** of each box **11** or **11***a* by controlling the locking device **13**. In addition, each locking device **13** of this embodiment normally locks each door **12** into a closed state. When each door **12** is to be opened, the door **12** is opened manually, and when each door **12** is to be closed, the door **12** is closed manually or automatically by a spring or the like.

[0075] The locker apparatus **1** of this embodiment is a so-called “normally closed-type locker apparatus”, and the control device **30** is configured to lock each locking device **13** in order to lock the door **12** into a closed state except when luggage is deposited in the box **11** or **11***a* or when luggage is taken out from the box **11** or **11***a*.

Luggage Deposit Procedure

[0076] Next, the procedure for the user to deposit luggage in the locker apparatus **1** will be described.

[0077] A state where no luggage is accommodated (state where the user can deposit luggage) in the plurality of boxes **11** and **11***a* is referred to as “standby mode”. Each box **11** or **11***a* in the standby mode is in a locked state. At this time, the locking device **13** locks the door **12** of the box **11** or **11***a* into a closed state.

[0078] In the standby mode, in order to deposit luggage in the box **11** or **11***a*, the user first performs acceptance of the start of use using the operation unit **20**. The control device **30** displays a virtual button for selecting deposit, on the display unit **22**, and starts the acceptance by the user tapping the virtual button. Here, the virtual button is an illustration displayed on the display unit **22**, and is a button that functions electrically when the user taps the button on the screen.

[0079] Then, the control device **30** displays a usage fee on the display unit **22**. The user who has confirmed the fee enters use data and settles the fee using the QR code reader **23** and the settlement terminal **24**. In the settlement, for example, the unique number of the IC tag of an IC card read by the settlement terminal **24** is stored in the memory **32**, and this data is used for authentication when luggage is to be taken out. After the settlement is performed, the control device **30** prints a receipt as a certificate of use using the printer **26**. The settlement is not limited to the form using an IC card, and may be another form such as credit card settlement or QR code settlement, or a plurality of forms may be selectively combined. In addition, when settlement is performed by a method other than an IC card, a private code such as a QR code (registered trademark) for unlocking can be printed on a receipt, and authentication can be performed by reading the printed private code.

Luggage Take-Out Procedure

[0080] Next, the procedure for the user to take out luggage from the locker apparatus **1** will be described.

[0081] In order to take out luggage from the locker apparatus **1**, the user enters necessary data into the operation unit **20**. The control device **30** displays a virtual button for selecting take-out, on the display unit **22**, and starts the acceptance by the user tapping the virtual button. At this time, if the daily usage fee for the locker apparatus **1** is exceeded, for example, if the locker apparatus **1** has been used over two days, the excess fee is deducted by credit card settlement, cashless settlement,

or the like to complete payment. After the payment is completed, the control device **30** unlocks the locking device **13** to open the door **12** of the box **11** or **11***a*. The user takes out the luggage from the box **11** or **11***a* and closes the door **12**. At this time, the control device **30** locks the locking device **13** to lock the door **12** of the box **11** or **11***a* into a closed state. (Technical features of locker apparatus of this embodiment)

[0082] In order to solve the problems of the conventional normally closed-type locker apparatuses described above, the normally closed-type locker apparatus **1** of this embodiment is configured to allow a "reopening door mode" for opening a door **12** again to be executed in order to permit an operation for taking out luggage or the like unintentionally left in a box **11** or **11***a*, redepositing luggage in a box **11** or **11***a*, or the like, immediately after luggage is deposited, without any fee.

Operation of Reopening Door Mode

[0083] In this embodiment, the control device **30** is configured to sequentially transition the screen of the display unit **22** from a predetermined "standby screen" in response to an operation on a virtual button by the user. FIG. **3** to FIG. **11** each show a transition screen displayed on the display unit **22** when the "reopening door mode" is executed. The control device **30** controls interactive screen transitions on the display unit **22** related to the "reopening door mode" based on the preset deposit program **32***a*.

[0084] First, when the user faces the display unit **22** of the operation unit **20**, the control device **30** displays a "standby screen" shown in FIG. **3** on the display unit **22**. A plurality of virtual buttons **60** that can be tapped are displayed on the standby screen. A deposit button **61** that is operated by the user when the user deposits luggage in a box **11** or **11***a*, a take-out button **62** that is operated by the user when the user takes out luggage from a box **11** or **11***a*, and a reopening door button **63** that can be operated by the user to give an instruction to reopen a door **12** are displayed in the upper part of the standby screen. The reopening door button **63** is a button that is operated by the user particularly when the user redeposits luggage in a box **11** or **11***a*, not when the user takes out luggage from a box **11** or **11***a*. On the standby screen, the deposit button **61** and the take-out button **62** are displayed side by side, and the reopening door button **63** is placed adjacent to the upper side of the take-out button **62**. The width of the reopening door button **63** is substantially equal to that of the take-out button **62**, and the height of the reopening door button **63** is smaller than that of the take-out button **62**. This size setting is made such that the take-out button **62** for take-out of luggage which occurs more frequently than redeposit of luggage is made more conspicuous than the reopening door button **63** to eliminate mistakes in button operation. In addition, a reservation deposit button **64** for instructing reservation deposit, reception, and shipping of luggage is displayed in the middle part of the standby screen. Furthermore, an operator menu button **65** for selecting a luggage handling business operator, a usage button **66** for instructing explanation of the usage and designating a box size, and a language button **67** for selecting a display language are displayed in the lower part of the standby screen.

[0085] On the standby screen, the user taps the reopening door button **63** in order to execute the reopening door mode. In this embodiment, a door **12** can be opened again without any fee within a predetermined time immediately after luggage is deposited. In this embodiment, "within 15 minutes" is set as within the predetermined time. In addition, in this embodiment, each door **12** is set such that the door **12** can be opened multiple times "within 15 minutes".

[0086] If the reopening door button **63** is tapped, the control device **30** causes the display of the display unit **22** to transition from the standby screen to a "confirmation screen" shown in FIG. **4**. On the confirmation screen, a text or the like, and a plurality of virtual buttons **60** that can be tapped are displayed. An explanation text "You can redeposit luggage within 15 minutes from deposit", and a small display **76** indicating the elapsed time from the deposit are displayed in the middle part of the confirmation screen. In addition, a cancellation button **68** for cancelling an operation, a confirmation button **69** for confirming an operation, and a back button **70** for returning to an immediately previous operation are displayed in the lower part of the confirmation screen.

[0087] On the confirmation screen, the user taps the confirmation button **69** in order to confirm the "reopening door mode".
[0088] If the confirmation button **69** is tapped, the control device **30** causes the display of the display unit **22** to transition to an "authentication selection screen" shown in FIG. **5**. On the authentication selection screen, a text or the like, and a plurality of virtual buttons **60** that can be tapped are displayed in order to select an authentication method. A text "Redeposit luggage" is displayed in the upper part of the authentication selection screen. In addition, a plurality of types of authentication buttons for selecting one of a plurality of authentication methods are displayed in the middle part of the authentication selection screen. That is, as the authentication buttons, an IC card button **71** for selecting the use of an IC card, a QR code button **72** for selecting the use of a QR code (registered trademark), and a number entry button **73** for selecting number entry are displayed in the middle part of the authentication selection screen. In addition, a cancellation button **68**, a usage button **74** for instructing explanation of the usage, and a language button **67** are displayed in the lower part of the authentication selection screen.
[0089] A payment method in depositing luggage differs depending on the user, and thus the user taps a suitable one from among the various buttons **71** to **73**.
[0090] Here, if the IC card button **71** is tapped, the control device **30** causes the display of the display unit **22** to transition from the authentication selection screen to an "authentication execution screen" shown in FIG. **6**. On the authentication execution screen, a text or the like, an illustration, and virtual buttons **60** that can be tapped are displayed. A text "IC card authentication" is displayed in the upper part of the authentication execution screen. In addition, an illustration prompting an operation on the authentication means corresponding to a selected one authentication method, and an explanation text therefor are displayed in the middle part of the authentication execution screen. That is, an explanation text "Please touch settlement terminal with IC card", and an illustration representing this are displayed in the middle part of the authentication execution screen. In addition, a cancellation button **68** and a back button **70** are displayed in the lower part of the authentication execution screen.
[0091] Meanwhile, if the QR code button **72** is tapped, the control device **30** causes the display of the display unit **22** to transition to an "authentication execution screen" shown in FIG. **7**. On the authentication execution screen, a text or the like, an illustration, and virtual buttons **60** that can be tapped are displayed. A text "QR code authentication" is displayed in the upper part of the authentication execution screen. In addition, an explanation text "Please hold QR code over scanner", and an illustration representing this are displayed in the middle part of the authentication execution screen. In addition, a cancellation button **68** and a back button **70** are displayed in the lower part of the authentication execution screen.
[0092] If the number entry button **73** is tapped, the control device **30** causes the display of the display unit **22** to transition to an "authentication execution screen" shown in FIG. **8**. On the authentication execution screen, a text or the like, an illustration, and virtual buttons **60** that can be tapped are displayed. A text "Number authentication" is displayed in the upper part of the authentication execution screen. In addition, an explanation text "Please enter **6**-digit reservation number", a ten-key button **75** as authentication means for entering a number, a small display **76** for displaying the entered number, and a confirmation button **69** are displayed in the middle part of the authentication execution screen. In addition, a cancellation button **68** and a back button **70** are displayed in the lower part of the authentication execution screen.
[0093] The user performs authentication in accordance with the authentication method corresponding to one selected screen out of the three authentication execution screens described above.
[0094] Here, it is assumed that the user performs "IC card authentication" in accordance with the authentication execution screen shown in FIG. **6**, for example. In this case, the control device **30** causes the display of the display unit **22** to transition from the authentication execution screen to a

"box selection screen" shown in FIG. **9**. On the box selection screen, a text or the like, an illustration, and virtual buttons **60** that can be tapped are displayed. An explanation text "Please select box in which luggage is to be redeposited", and an illustration of a locker apparatus are displayed in the upper part of the box selection screen. In the illustration of the locker apparatus, the numbers corresponding to the boxes **11** and **11***a* in each of which the user has deposited luggage, and selection buttons **80** that can be selected to select these numbers are displayed. In this illustration, boxes with numbers corresponding to the respective boxes **11** and **11***a* are the selection buttons **80**. In addition, a cancellation button **68** and a back button **70** are displayed in the lower part of the box selection screen.

[0095] If there are a plurality of target boxes, the corresponding boxes are displayed in color (e.g., green) in the illustration of the locker apparatus on the box selection screen. For example, in FIG. **9**, if there are two target boxes (boxes with "0028" and "0029"), these two boxes are displayed in color in the illustration of the locker apparatus (shown with diagonal lines in FIG. **9**). The user selects a box to be unlocked from the two boxes by tapping. If there is only one target box, the control device **30** skips the display of this box selection screen and causes the display to transition to a "box selection screen" shown in FIG. **10**.

[0096] On the box selection screen in FIG. **10**, a text or the like, an

[0097] illustration, and virtual buttons **60** that can be tapped are displayed. An explanation text "You can open the door" is displayed in the upper part of the box selection screen, and a text "Box number 0028" indicating the target box, and an illustration of a locker apparatus corresponding to FIG. **9** are displayed in the middle part of the same screen. In this case, the target box with "0028" is displayed in color (e.g., green) in the illustration of the locker apparatus (shown with diagonal lines in FIG. **10**). In addition, an explanation text prompting an operation on the lever **14** after luggage is deposited again, and an illustration for the operation on the lever **14** are displayed in the lower part of the box selection screen. That is, an explanation text "Please lower lever after luggage is deposited again", and an illustration for the operation on the lever **14** are displayed in the lower part of the box selection screen.

[0098] When this box selection screen is displayed, the locking device **13** of the target box **11** or **11***a* in the actual locker apparatus **1** is unlocked. The user opens the door **12** of this box **11** or **11***a*, takes out unintentionally left luggage or the like from the box **11** or **11***a* or deposits luggage again, then closes the door **12**, and lowers the lever **14** to the closed side.

[0099] When the lever **14** is lowered to the closed side, the control device **30** displays an "end screen" shown in FIG. **11** on the display unit **22**. An explanation text "Thank you for using our service" is displayed in the middle part of the end screen. Then, the control device **30** returns the display of the display unit **22** to the standby screen shown in FIG. **3**.

[0100] The above is a series of descriptions regarding the transition screens when the user correctly selects and taps the reopening door button **63** in order to execute the reopening door mode.

[0101] In contrast, if the user intends to execute the reopening door mode but taps the take-out button **62** by mistake instead of the reopening door button **63** on the standby screen shown in FIG. **3**, the screen of the display unit **22** transitions as follows. FIG. **12** to FIG. **24** each show a transition screen of the display unit **22** in this case.

[0102] In other words, the control device **30** causes the display of the display unit **22** to transition to an "authentication selection screen" shown in FIG. **12**. On the authentication selection screen, a text or the like, and a plurality of virtual buttons **60** that can be tapped are displayed in order to select an authentication method. A text "Take out" is displayed in the upper part of the authentication selection screen. In addition, a plurality of types of authentication buttons for selecting one of the plurality of authentication methods are displayed in the middle part of the authentication selection screen.

[0103] That is, as the authentication buttons, an IC card button **71** for selecting the use of an IC card, a QR code button **72** for selecting the use of a QR code (registered trademark), and a number

entry button **73** for selecting number entry are displayed in the middle part of the authentication selection screen. In addition, a cancellation button **68** for cancelling an operation, a usage button **74** for instructing explanation of the usage, and a language button **67** are displayed in the lower part of the authentication selection screen.

[0104] A payment method in depositing luggage differs depending on the user, and thus the user taps a suitable one from among the various buttons **71** to **73**.

[0105] Here, if the IC card button **71** is tapped, the control device **30** causes the display of the display unit **22** to transition from the authentication selection screen to an "authentication execution screen" shown in FIG. **13**. On the authentication execution screen, a text or the like, an illustration, and virtual buttons **60** that can be tapped are displayed. A text "IC card authentication" is displayed in the upper part of the authentication execution screen. In addition, an illustration prompting an operation on the authentication means corresponding to a selected one authentication method, and an explanation text therefor are displayed in the middle part of the authentication execution screen. That is, an explanation text "Please touch settlement terminal with IC card", and an illustration representing this are displayed in the middle part of the authentication execution screen. In addition, a cancellation button **68** and a back button **70** are displayed in the lower part of the authentication execution screen.

[0106] Meanwhile, if the QR code button **72** is tapped, the control device **30** causes the display of the display unit **22** to transition to an "authentication execution screen" shown in FIG. **14**. On the authentication execution screen, a text or the like, an illustration, and virtual buttons **60** that can be tapped are displayed. A text "QR code authentication" is displayed in the upper part of the authentication execution screen. In addition, an explanation text "Please hold QR code over scanner", and an illustration representing this are displayed in the middle part of the authentication execution screen. In addition, a cancellation button **68** and a back button **70** are displayed in the lower part of the authentication execution screen.

[0107] If the number entry button **73** is tapped, the control device **30** causes the display of the display unit **22** to transition to an "authentication execution screen" shown in FIG. **15**. On the authentication execution screen, a text or the like, an illustration, and virtual buttons **60** that can be tapped are displayed. A text "Number authentication" is displayed in the upper part of the authentication execution screen. In addition, an explanation text "Please enter 6-digit reservation number", a ten-key button **75** as authentication means for entering a number, a small display **76** for displaying the entered number, and a confirmation button **69** are displayed in the middle part of the authentication execution screen. In addition, a cancellation button **68** and a back button **70** are displayed in the lower part of the authentication execution screen.

[0108] The user performs authentication in accordance with the authentication method corresponding to one selected screen out of the three authentication execution screens described above.

[0109] Here, it is assumed that the user performs "IC card authentication" in accordance with the authentication execution screen shown in FIG. **13**, for example. In this case, the control device **30** causes the display of the display unit **22** to transition from the authentication execution screen to a "box selection screen" shown in FIG. **16**. On the box selection screen, a text or the like, an illustration, and virtual buttons **60** that can be tapped are displayed. An explanation text "Please select box from which luggage is to be taken out" is displayed in the upper part of the box selection screen. An illustration of a locker apparatus and an explanation of the coloring in the illustration are displayed in the middle part of the box selection screen. In the illustration of the locker apparatus, the numbers corresponding to the boxes **11** and **11***a* in each of which the user has deposited luggage, and selection buttons **80** that can be selected to select these numbers are displayed. In this illustration, boxes with numbers corresponding to the respective boxes **11** and **11***a* are the selection buttons **80**. In addition, a cancellation button **68** and a back button **70** are displayed in the lower part of the box selection screen.

[0110] If the user performs authentication with an IC card, there may be a plurality of target boxes. In this case, the target boxes are displayed in color (e.g., green or yellow) in the illustration of the locker apparatus on the box selection screen shown in FIG. **16**. For example, in FIG. **16**, if there are a plurality of target boxes, the corresponding boxes are displayed in color in the illustration of the locker apparatus (shown with diagonal lines or a grid in FIG. **16**). The user selects a box to be unlocked from among the colored boxes by tapping. If there is only one target box, the control device **30** skips the display of the box selection screen in FIG. **16**.

[0111] If the user taps a box to be unlocked from among the colored boxes on the box selection screen in FIG. **16** and this tap is "within 15 minutes" from deposit of luggage, the control device **30** causes the display of the display unit **22** to transition to a "take-out confirmation screen" shown in FIG. **17**. On the take-out confirmation screen, a text or the like, and a plurality of virtual buttons **60** that can be tapped are displayed. A text "Take-out confirmation" and an explanation text "This take-out is within 15 minutes from deposit. Please tap 'Redeposit luggage' if you wish to deposit luggage again, or please tap 'Proceed with take-out as is' if you wish to take out" are displayed in the upper part of the take-out confirmation screen. In addition, a luggage redeposit button **78** for instructing redeposit of luggage and a take-out button **79** for instructing take-out of luggage as is are displayed in the middle part of the take-out confirmation screen. Furthermore, a cancellation button **68** is displayed in the lower part of the take-out confirmation screen. In this embodiment, this take-out confirmation screen is provided on the assumption that the user may intend to redeposit luggage but tap the take-out button **62** by mistake instead of the reopening door button **63**.

[0112] If the user selectively taps either one of the buttons **78** and **79** on the take-out confirmation screen, the control device **30** causes the display of the display unit **22** to transition to a "redeposit confirmation screen" shown in FIG. **18** or a "first warning screen" shown in FIG. **21**. However, even if take-out of luggage is "within 15 minutes", if the luggage is to be taken out again, the redeposit confirmation screen and the box unlocking screen are not displayed.

[0113] If the user taps the luggage redeposit button **78** on the take-out confirmation screen, the control device **30** causes the display of the display unit **22** to transition to the "redeposit confirmation screen" shown in FIG. **18**. On the redeposit confirmation screen, a text or the like, and a plurality of virtual buttons **60** that can be tapped are displayed. An explanation text "You can redeposit luggage within 15 minutes after deposit", and a small display **76** indicating the elapsed time from the deposit are displayed in the middle part of the redeposit confirmation screen. In addition, a cancellation button **68** and a confirmation button **69** are displayed in the lower part of the redeposit confirmation screen.

[0114] If the user taps the confirmation button **69**, the control device **30** causes the display of the display unit **22** to transition to a "box unlocking screen" shown in FIG. **19**. On the box unlocking screen, a text or the like, an illustration, and virtual buttons **60** that can be tapped are displayed. An explanation text "You can open the door" is displayed in the upper part of the box unlocking screen, and a text "Box number 0028" indicating a target box, and an illustration of a locker apparatus are displayed in the middle part of the same screen. In this case, the target box **81** with "0028" is colored (e.g., in green) and blinked in the illustration of the locker apparatus (shown with diagonal lines in FIG. **19**). In addition, an explanation text prompting an operation on the lever **14** after luggage is deposited again, and an illustration for the operation on the lever **14** are displayed in the lower part of the box unlocking screen. That is, an explanation text "Please lower lever after luggage is deposited again", and an illustration for the operation on the lever **14** are displayed in the lower part of the box unlocking screen.

[0115] When this box unlocking screen is displayed, the control device **30** unlocks the locking device **13** of the target box **11** or **11***a* in the actual locker apparatus **1**. The user opens the door **12** of this box **11** or **11***a*, takes out luggage from the box **11** or **11***a*, then closes the door **12**, and lowers the lever **14** to the closed side.

[0116] When the lever **14** is lowered to the closed side, the control device **30** causes the display of the display unit **22** to transition to an “end screen” shown in FIG. **20**. An explanation text “Thank you for using our service” is displayed in the middle part of the end screen. Then, the control device **30** returns the display of the display unit **22** to the standby screen shown in FIG. **3**.
[0117] Meanwhile, if the user taps the take-out button **79** on the take-out confirmation screen shown in FIG. **17**, the control device **30** causes the display of the display unit **22** to transition to the “first warning screen” shown in FIG. **21**. On the first warning screen, a text or the like, and virtual buttons **60** that can be tapped are displayed. An explanation text “Is it OK if use of this box is ended when you take out the luggage?” is displayed in the middle part of the first warning screen. In addition, a confirmation button **69** and a back button **70** are displayed in the lower part of the first warning screen.
[0118] If the user taps the confirmation button **69** on the first warning screen, the control device **30** causes the display of the display unit **22** to transition to a “second warning screen” shown in FIG. **22**. On the second warning screen, a text or the like, and virtual buttons **60** that can be tapped are displayed. An explanation text “Warning: If you tap ‘Confirm’, the luggage will be regarded as being taken out, and we will not be responsible for any loss of luggage. Is it really OK to proceed?” is displayed in the middle part of the second warning screen. In addition, a confirmation button **69** and a back button **70** are displayed in the lower part of the second warning screen.
[0119] If the user taps the confirmation button **69** on the second warning screen shown in FIG. **22**, the control device **30** displays a “box unlocking screen” shown in FIG. **23** on the display unit **22**. On the box unlocking screen, a text or the like, and an illustration that can be tapped are displayed. An explanation text “You can open the door” is displayed in the upper part of the box unlocking screen. A text “Box number 0028” indicating a target box **81**, and an illustration of a locker apparatus are displayed in the middle part of the box unlocking screen. In this case, the target box **81** with “0028” is colored (e.g., in green) and blinked in the illustration of the locker apparatus on the box unlocking screen (shown with diagonal lines in FIG. **23**). In addition, an explanation text “Please take out luggage from box whose light is blinking” is displayed in the lower part of the box unlocking screen.
[0120] The box **81** blinking in the illustration of the locker apparatus displayed on the box unlocking screen shown in FIG. **23** operates to indicate whether or not there is luggage in the actual box **11** or **11***a*. When this box unlocking screen is displayed, the control device **30** performs control such that the locking device **13** is unlocked in order to open the door **12** of the box **11** or **11***a* in which luggage is deposited, and when the door **12** is closed thereafter, the locking device **13** is locked.
[0121] After the door **12** of the box **11** from which the user has taken out the luggage is locked, the control device **30** causes the display of the display unit **22** to transition to an “end screen” shown in FIG. **24**. An explanation text “Thank you for using our service. We look forward to the next time you use our service.” is displayed in the middle part of the end screen. Then, the control device **30** returns the display of the display unit **22** to the standby screen shown in FIG. **3**.

Action and Effects of Locker Apparatus

[0122] With the configuration of the locker apparatus **1** of this embodiment described above, in the operation of the reopening door mode described above, when the reopening door button **63** is operated within the predetermined time (“within 15 minutes” in this embodiment) after luggage is deposited in the box **11** or **11***a*, the door **12** is closed, and the locking device **13** is locked once, the control device **30** unlocks the locking device **13**, on a condition that authentication of the user by the authentication means (the display unit **22**, the QR code reader **23**, and the settlement terminal **24**) of the operation unit **20** is established, in order to permit the door **12** to be reopened, and the control device **30** locks the locking device **13** again when the door **12** is closed thereafter.
[0123] Therefore, for example, when the user takes out luggage or the like unintentionally left in the box **11** or **11***a* or redeposits luggage immediately after depositing luggage in the box **11** or **11***a*,

reopening of the door **12** by unlocking and locking after the door **12** is closed again are performed, without paying a usage fee, on the condition that the reopening door button **63** is operated within the predetermined time and authentication of the user is established. Thus, immediately after the operation for depositing luggage is completed, redeposit of luggage, etc., can be performed without forcing the user to bear the burden of a new usage fee.

[0124] With the configuration of this embodiment, on the standby screen shown in FIG. **3**, the deposit button **61** and the take-out button **62** as the virtual buttons **60** are displayed side by side, and the reopening door button **63** is placed adjacent to the upper side of the take-out button **62** and is smaller in size than the take-out button **62**. Here, the deposit button **61** which is frequently used is used for an operation in depositing luggage, and the take-out button **62** which is frequently used is used for an operation in taking out luggage, so that the uses of the deposit button **61** and the take-out button **62** are different from each other, and there is little risk of selecting a wrong button at the time of operation. In contrast, although the reopening door button **63** is used less frequently, the reopening door button **63** is used for an operation in redepositing luggage, and the use thereof is similar to that of the take-out button **62**, so that there is a risk of selecting a wrong button from the reopening door button **63** and the take-out button **62** at the time of operation. With the above configuration, since the reopening door button **63** is placed adjacent to the upper side of the take-out button **62** and is smaller in size than the take-out button **62**, the take-out button **62** is more conspicuous than the reopening door button **63** and is easily distinguished from the reopening door button **63**, so that there is less risk of selecting a wrong button when operating one of these buttons. Therefore, it is possible to reduce a situation in which the user selects and operates a wrong one out of the reopening door button **63** and the take-out button **62** and performs operation from the beginning.

[0125] With the configuration of this embodiment, when the reopening door button **63** is operated on the standby screen shown in FIG. **3**, the display of the display unit **22** transitions from the standby screen to the confirmation screen shown in FIG. **4**, and an explanation text “You can redeposit luggage within a predetermined time after deposit”, and the elapsed time after the deposit are displayed on this confirmation screen. Accordingly, the user can check the content of the selected operation and the remaining time for which the operation is possible. Therefore, after the reopening door button **63** is operated, the user can be prompted to complete redeposit of luggage or the like within the predetermined time, so that it is possible to reduce a mistake of the user trying to continue operation.

[0126] With the configuration of this embodiment, when the confirmation button **69** is operated on the confirmation screen shown in FIG. **4**, the display of the display unit **22** transitions from the confirmation screen to the authentication selection screen shown in FIG. **5**, and a text “Redeposit luggage” is displayed on the authentication selection screen, so that the user can confirm that the user has shifted to an operation such as redeposit of luggage, rather than take-out of luggage. In addition, since the plurality of types of authentication buttons **71** to **73** for selecting one of the plurality of authentication methods are displayed, the user's operation for entering an authentication method is simplified. Therefore, after operating the confirmation button **69**, the user can select an authentication method in a short time.

[0127] With the configuration of this embodiment, when one of the authentication buttons **71** to **73** is operated, the display of the display unit **22** transitions from the authentication selection screen shown in FIG. **5** to one of the authentication execution screens shown in FIG. **6** to FIG. **8**, the authentication means (ten-key button **75**) or the illustration prompting an operation on the authentication means (the QR code reader **23**, the settlement terminal **24**, etc.) corresponding to the selected one authentication method and the explanation text therefor are displayed on the authentication execution screen, so that it becomes easier for the user to perform the operation for performing authentication. Therefore, after operating the authentication buttons **71** to **73**, the user can perform authentication in a short time.

[0128] With the configuration of this embodiment, when the authentication means (the QR code reader **23**, the settlement terminal **24**, etc., and the ten-key button **75**) on the authentication execution screens shown in FIG. **6** to FIG. **8** is operated, the display of the display unit **22** transitions from the authentication execution screen to the box selection screen shown in FIG. **9** and FIG. **10**, and the number corresponding to each box **11** or **11***a* in which the user has deposited luggage and the selection button **80** that can be operated to select this number are displayed on the box selection screen, so that it becomes easier for the user to select the box **11** or **11***a* in which the user has deposited luggage. In addition, since the operation that should be performed by the user on the lever **14** after the user deposits luggage again (redeposits luggage) is prompted with an illustration, the user is prevented from forgetting to operate the lever **14**, and is prevented from forgetting to close and lock the door **12**. Therefore, the user can specify the box **11** or **11***a* in which the user is to redeposit luggage, in a short time, and can more assuredly lock the door **12** of this box **11** or **11***a* after redepositing luggage.

[0129] With the configuration of this embodiment, when the lever **14** is operated, the display of the display unit **22** transitions from the box selection screen shown in FIG. **9** and FIG. **10** to the end screen shown in FIG. **11**, and the text “Thank you for using our service” is displayed on the end screen, so that the user is notified of the end of redeposit of luggage. Therefore, the user can confirm the completion of the operation for redepositing luggage.

[0130] With the configuration of this embodiment, the predetermined time for permitting the door **12** to be reopened is 15 minutes after the locking device **13** is locked once. This 15-minute period can be a sufficient time for taking out items, etc., left behind and for redepositing luggage. Therefore, it is possible to provide the user of the locker apparatus **1** with a convenience that is effective in terms of time.

[0131] With the configuration of this embodiment, the control device **30** is configured to permit the door **12** to be reopened multiple times within the predetermined time. Accordingly, it is possible to redeposit luggage multiple times as needed by the user. Therefore, it is possible to provide the user of the locker apparatus **1** with a convenience that is effective in terms of the number of times.

[0132] With the configuration of this embodiment, if there are a plurality of boxes **11** and **11***a* in which the same user has deposited luggage, the control device **30** unlocks the locking device **13** corresponding to only the box **11** or **11***a* selected through an operation on the operation unit **20**. Therefore, if there are a plurality of boxes **11** and **11***a* in which the same user has deposited luggage, through an operation on the operation unit **20**, the locking device **13** corresponding to only the selected box **11** or **11***a* is unlocked, so that it is possible to limit redeposit of luggage to only the specific box **11** or **11***a*. Thus, it is possible to provide the user of the locker apparatus **1** with an effective convenience without any loss of operation.

Second Embodiment

[0133] Next, a second embodiment will be described. In the following description, the components that are equivalent to those of the first embodiment are designated by the same reference characters, the description thereof is omitted, and the differences will be mainly described.

[0134] This embodiment is different from the first embodiment in the content of the transition screen displayed on the display unit **22** when the “reopening door mode” is executed. That is, in the first embodiment, the reopening door button **63** is displayed on the standby screen shown in FIG. **3**. In contrast, in this embodiment, instead of the standby screen shown in FIG. **3**, another “standby screen” shown in FIG. **25** and a “reopening door confirmation screen” shown in FIG. **26** are provided.

[0135] Here, on the standby screen shown in FIG. **25**, a deposit button **61** and a take-out button **62** are displayed side by side in the same size, and a reopening door button is not displayed above the take-out button **62**. The other virtual buttons **60** are the same as those on the standby screen shown in FIG. **3**. In addition, a reopening door button **63** and a take-out button **62** are displayed side by side in the same size in the middle part of the reopening door confirmation screen shown in FIG.

26, and only a cancellation button **68** is displayed in the lower part of the same screen.
[0136] With the configuration of this embodiment, since a reopening door button is not displayed on the standby screen and the reopening door button **63** is displayed on the reopening door confirmation screen to which a transition is made next, the user can avoid operating a wrong button out of the take-out button **62** for taking out luggage and the reopening door button **63** for redepositing luggage, etc., on the standby screen, and can reconfirm the existence of the reopening door button **63** and its function on the next reopening door confirmation screen.
Other Embodiments
[0137] The disclosed technique is not limited to the above embodiments, and can also be implemented by changing part of the components as appropriate without departing from the scope of the gist of the disclosed technique.
[0138] (1) In the above embodiments, for the locker apparatus **1**, it is assumed that the user who deposits luggage and the user who takes out luggage are the same person. In contrast, it is also possible to assume that the user who deposits luggage and the user who takes out luggage are different persons. More specifically, in recent years, the idea of using railroad stations as logistics bases has become more widespread, so that it is conceivable that the user who deposits luggage is a transport business operator who delivers commodities ordered by a general consumer, and the user who takes out luggage is the general consumer who had ordered the commodities. In this case, for example, a specific transport business operator is allowed to use the locker apparatus **1**, and after the transport business operator is authenticated using the operation unit **20**, the deposit program **32***a* is activated. For authentication in taking out luggage, for example, a private code for authentication such as a QR code (registered trademark) for authentication may be transmitted to a mobile terminal or the like of the general consumer, and after the private code is authenticated, the take-out program **32***b* may be activated.
[0139] (2) In the above embodiments, as an example, the disclosed technique is embodied in the locker apparatus **1** installed on the premises of a station, but is not limited thereto, and, for example, a home delivery box installed in a housing complex or the like may be adopted.
[0140] The disclosed technique can be used, for example, for a locker apparatus installed on the premises of a station.
REFERENCE SIGNS LIST
[0141] **1** Locker apparatus [0142] **11** Box [0143] **11***a* Small box [0144] **12** Door [0145] **13** Locking device [0146] **14** Lever (operation member) [0147] **20** Operation unit [0148] **22** Display unit (authentication member) [0149] **23** QR code reader (authentication member) [0150] **24** Settlement terminal (authentication member) [0151] **30** Control device [0152] **63** Reopening door button [0153] **72** QR code button (authentication button) [0154] **73** Number entry button (authentication button) [0155] **75** Ten-key button (authentication button) [0156] **80** Selection button

Claims

1. A locker apparatus comprising: a box capable of accommodating luggage therein; a door configured to open and close the box; a locking device configured to unlockably lock the door; an operation unit configured to receive an operation by a user; and a control device configured to control the locking device in response to an operation on the operation unit by the user, wherein the operation unit includes authentication member configured to authenticate the user, the control device is configured to lock the locking device in order to lock the door into a closed state except when the luggage is deposited in the box and when the luggage is taken out from the box, the operation unit includes a reopening door button that can be operated by the user in order to give an instruction to reopen the door, and when the reopening door button is operated within a predetermined time after the luggage is deposited in the box, the door is closed, and the locking device is locked once, the control device unlocks the locking device, on a condition that

authentication of the user by the authentication member is established, in order to permit the door to be reopened, and locks the locking device again when the door is closed thereafter.

2. The locker apparatus according to claim 1, wherein the operation unit includes a display unit configured to display at least one of a virtual button, an illustration of a locker apparatus, and a text, the control device is configured to cause a screen of the display unit to sequentially transition from a standby screen in response to an operation on the virtual button by the user, as the virtual button, a deposit button that is operated by the user when the user deposits the luggage in the box, a take-out button that is operated by the user when the user takes out the luggage from the box, and the reopening door button are displayed on the standby screen, the reopening door button is a button that is operated by the user particularly when the user redeposits the luggage in the box, not when the user takes out the luggage from the box, and on the standby screen, the deposit button and the take-out button are displayed side by side, and the reopening door button is placed adjacent to an upper side of the take-out button and is smaller in size than the take-out button.

3. The locker apparatus according to claim 2, wherein when the reopening door button is operated, the control device causes a display of the display unit to transition from the standby screen to a confirmation screen, and an explanation text “You can redeposit luggage within a predetermined time after deposit”, an elapsed time after the deposit, and a confirmation button as the virtual button are displayed on the confirmation screen.

4. The locker apparatus according to claim 3, wherein when the confirmation button is operated, the control device causes the display of the display unit to transition from the confirmation screen to an authentication selection screen, and a text “Redeposit luggage” and a plurality of types of authentication buttons for selecting one of a plurality of authentication methods are displayed on the authentication selection screen.

5. The locker apparatus according to claim 4, wherein when one of the authentication buttons is operated, the control device causes the display of the display unit to transition from the authentication selection screen to an authentication execution screen, and the authentication member or an illustration prompting an operation on the authentication member corresponding to the selected one authentication method, and an explanation text therefor are displayed on the authentication execution screen.

6. The locker apparatus according to claim 5, wherein the door is provided with operation member that is operated by the user in order to request the locking device to lock when the user has deposited the luggage in the box and has closed the door, when the authentication member is operated, the control device causes the display of the display unit to transition from the authentication execution screen to a box selection screen, and a number corresponding to the box in which the user has deposited the luggage, a selection button that can be operated in order to select the number, an explanation text prompting an operation on the operation member after the luggage is deposited again, and an illustration for the operation on the operation member are displayed on the box selection screen.

7. The locker apparatus according to claim 6, wherein when the operation member is operated, the control device causes the display of the display unit to transition from the box selection screen to an end screen, and a text “Thank you for using our service” is displayed on the end screen.

8. The locker apparatus according to claim 1, wherein the predetermined time for permitting the door to be reopened is 15 minutes after the locking device is locked once.

9. The locker apparatus according to claim 1, wherein the control device is configured to permit the door to be reopened multiple times within the predetermined time.

10. The locker apparatus according to claim 1, wherein, if there are a plurality of the boxes in which the luggage has been deposited by the same user, the control device unlocks the locking device corresponding to only the box selected through an operation on the operation unit.

11. The locker apparatus according to claim 3, wherein the predetermined time for permitting the door to be reopened is 15 minutes after the locking device is locked once.

12. The locker apparatus according to claim 3, wherein the control device is configured to permit the door to be reopened multiple times within the predetermined time.

13. The locker apparatus according to claim 6, wherein, if there are a plurality of the boxes in which the luggage has been deposited by the same user, the control device unlocks the locking device corresponding to only the box selected through an operation on the operation unit.