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METHOD OF EXCHANGING AN ARTICLE AND APPARATUS THEREFOR

This invention relates to a method of exchanging an article and an apparatus therefor, more particularly, but not exclusively, to a method of automatically exchanging an article and an apparatus therefor through a locker, wherein the article can be automatically left and a predetermined person and can pick it up and return it to a predetermined person.

For example, when a person has dirty shirts cleaned at a shop, the shirts must be taken to the cleaning shop or to an agency, or the cleaning shop or the agency has to be asked to pick them up at the person's home.

Moreover, when photographic films need to be developed and printed, they are brought to a photograph shop or an agency for development. Either glossy or silk-finish is specified for the printing, and one of service, business card and wallet sizes is specified. Further, panorama size will be specified for panorama films. In this case, the delivery day will be indicated by the photograph shop or the like, and films being developed by the photograph shop or the like are received and can be picked up after the delivery day.

However, because business hours of the cleaning shop, the photograph shop, the agent or the like usually do not extend beyond office hours of companies in general, it is often difficult for a dual-income family, a single person or the like to visit the cleaning shop, the photograph shop, the agent or the like during normal hours of operation.

Viewed from one aspect the present invention provides a method of exchanging an article from a first person to a second person through a locker means, comprising:

setting said locker means into a receiving mode in

which an article to be exchanged can be deposited;

inputting a user identification code to access a vacant locker and placing said article in the locker;

memorizing in said locker means the identity of said vacant locker in which the article is left, and said user identification code;

setting said locker means into a mode in which the locker can be opened for the article to be collected by said second person; and

outputting said user identification code during accessing of said locker by said second person.

Viewed from another aspect the present invention provides apparatus for exchanging an article between a first person and a second person, comprising:

locker means provided with a plurality of lockers;

control means interchangeable between a receiving mode in which an article can be left in a locker, and a mode in which the locker can be opened for the collection of said article, said control means being adapted in said receiving mode to memorise a user identification code and the identity of a locker in which an article is left, and to output said user identification code during the accessing of said locker by said second person;

input means for putting said locker means into a receiving mode and into a mode in which the article can be collected and for inputting said user identification code; and

output means for outputting a user identification code in response to an output signal from said control means.

Preferably said user identification code is a number which will be easily memorised by the user, such as his telephone number, although other codes such as a password or surname may also be used.

According to one embodiment, an apparatus for automatically exchanging an article, wherein the

article can be left with a predetermined person through a locker and the article can be received from the predetermined person through the locker, is characterized in that said apparatus comprises: a main body of said apparatus for automatically exchanging an article, provided thereon with a plurality of lockers; a control section constructed so as to be changed over from a receiving mode to a return mode and vice versa, in which, under the receiving mode, a memorized identification number is input to automatically index a vacant locker, a number of the vacant locker, in which the article is left, and said memorized identification number are memorized, and further, a display number of said memorized identification number is output during the opening of a locker, and, under the return mode, the number of a new vacant locker, in which the article is left, and said memorized identification number are memorized, and a new locker, in which the article corresponding to said memorized identification number, is automatically indexed on the basis of said memorized identification number; an input means capable of inputting the receiving mode, the return mode and the memorized identification number; and a display means for displaying a memorized identification number corresponding to an opened locker in response to a display signal from the control section; whereby said locker is additionally used as a receiving locker or a return locker.

Thus there is provided in at least preferred embodiments a method of exchanging an article and an apparatus therefor, wherein for example deposit and return of a shirt to be cleaned or films for development and printing can be done outside normal hours of operation, so that the dual-income family, the single person or the like can use services outside normal hours of operation.

According to another embodiment, an apparatus for

automatically exchanging an article, wherein the article can be left with a predetermined person through a locker and the article can be received from the predetermined person through the locker, is characterized in that said apparatus comprises: a main body of said apparatus for automatically exchanging an article, provided thereon with a plurality of lockers; a control section constructed so as to be changed over between a receiving mode, a processing mode and a return mode, in which, under the receiving mode, required information and a memorized identification number are input to automatically index a vacant locker, a number of a vacant locker, in which the article is left, said memorized identification number and a selected finish condition of the article (the required information) are memorized and a receiving date is displayed, under the return mode the number of a new vacant locker, in which a finished product is stored, said identification number and a requested fee are memorized, and the new locker, in which the finished product corresponds to said memorized identification number is automatically indexed on the basis of said memorized identification number; an input means capable of inputting the receiving mode, the processing mode, the return mode, the identification number and the finish condition of the article; a display means for displaying a memorized identification number corresponding to the opened locker and the finish condition of the article in response to a display signal from the control section; whereby said locker is additionally used as a locker for leaving or a locker for receiving.

Preferably said control section is characterized in that under the return mode the number of the new locker in which a finished product in the selected condition is stored, a memorized identification number and a requested fee are memorized, the requested fee is displayed on the display means when a user inputs the

memorized identification number, and a lock of the locker in which a finished product in the selected condition is stored is released.

In one embodiment plural lockers are provided on the main body of an apparatus for automatically exchanging an article, in which the article can be left to the predetermined person and received from the predetermined person through the locker. The control section is located in the main body and constructed so as to switch between the receiving mode and the return mode. And, under the receiving mode the control section automatically indexes a vacant locker by the input of the identification number, memorizes the number of the vacant locker in which the article is left and the identification number and outputs the display signal of said identification number on opening the locker. Moreover, under the return mode the control section memorizes the number of a new vacant locker in which the article is left and said identification number and automatically indexes the new vacant locker, in which the article is left, corresponding to said identification number, based on the identification number. Further, the identification number can be input by the input means and the display means displays the identification number corresponding to the opened locker based on the display signal from the control section.

Thus, the article can be left to the predetermined person and received from the predetermined person through the apparatus automatically, therefore, the article can be exchanged 24 hours a day.

In another embodiment, plural lockers are provided on the main body of an apparatus for automatically exchanging an article in which the article can be left to the predetermined person and received from the predetermined person through the locker. Moreover, the control section is located in the main body and constructed so as to switch between the receiving mode,

the processing mode and the return mode. And, under the receiving mode the control section automatically indexes a vacant locker by the input of the identification number, memorizes the number of the locker in which the article is left, the identification number and the selected finish condition of the article, and displays and prints out the information of said identification number and the selected finish condition when the locker is opened under the processing mode. Moreover, under the return mode the control section memorizes the number of a new vacant locker in which the finished product is stored and said identification number and automatically indexes the new vacant locker, in which the product is stored, corresponding to said identification number, based on the identification number. Further, the receiving mode, the processing mode, the return mode, the identification number and the finish condition of the article are input by the input means. Moreover, the display and print means displays and prints the identification number corresponding to the opened locker and the finish condition of the article based on the display signal from the control section.

As above-mentioned, the selected finish condition can be communicated in leaving the article to the predetermined person through the apparatus for automatically exchanging the article and can be received from the predetermined person, therefore, the article can be exchanged any time. Further, the used locker can be arbitrarily selected under the return mode, the receiving mode and the processing mode, therefore, the locker can be used effectively.

Moreover, in preferred embodiments, under the return mode the number of the new locker in which the finished product in the selected finish condition is stored, the identification number and the requested fee are memorized, the requested fee is displayed on the display means when the user inputs the identification

number, and the lock on the door of the locker, in which the article processed in the selected finish condition is stored, is released when the displayed requested-fee is deposited.

Therefore, such may be also applied to the article which fee becomes clear after the service has been performed.

Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, wherein:-

Fig. 1 is a perspective view showing a first embodiment of an apparatus for automatically exchanging an article according to this invention.

Fig. 2 is a block diagram showing the first embodiment of the apparatus for automatically exchanging the article.

Fig. 3 is a flow chart explaining a case that a shirt to be cleaned is left in the apparatus for automatically exchanging the article according to the first embodiment.

Fig. 4 is a flow chart explaining a case that the shirt left in the locker of the apparatus for automatically exchanging the article according to the first embodiment is taken up by a cleaning shop or an agent.

Fig. 5 is a flow chart explaining a case that the cleaned shirt is stored in the locker of the apparatus for automatically exchanging the article according to the first embodiment by the cleaning shop or the agent.

Fig. 6 is a flow chart explaining a case that the cleaned shirt is received from the apparatus for automatically exchanging the article according to the first embodiment by the person who left the shirt.

Fig. 7 is a flow chart explaining a case that the cleaned shirt remaining in the locker of the apparatus for automatically exchanging the article according to the first embodiment is collected.

Fig. 8 is a perspective view showing a second embodiment of an apparatus for automatically exchanging an article according to this invention.

Fig. 9 is an enlarged view of a portion in the apparatus for automatically exchanging the article according to the second embodiment.

Fig. 10 is a block diagram showing the second embodiment of the apparatus for automatically exchanging the article.

Fig. 11 is a flow chart explaining a case that films to be developed are left in the apparatus for automatically exchanging the article according to the second embodiment.

Fig. 12 is a flow chart explaining a case that the films left in the locker of the apparatus for automatically exchanging the article according to the second embodiment are taken up by a photographing shop or an agent.

Fig. 13 is a flow chart explaining a case that the developed films and printed photographs are stored in the locker of the apparatus for automatically exchanging the article according to the second embodiment by the cleaning shop or the agent.

Fig. 14 is a flow chart explaining a case that the developed films and the printed photographs are received from the apparatus for automatically exchanging the article according to the second embodiment by the person who left the films.

Fig. 15 is a flow chart explaining a case that the developed films and the printed photographs remaining in the locker of the apparatus for automatically exchanging the article according to the first embodiment are collected.

Figs. 16(A) and 16(B) are enlarged views showing other arrangements for use with the apparatus for automatically exchanging the article according to the second embodiment.

Fig. 17 is a perspective view showing an automatic vending machine provided with the apparatus for automatically exchanging the article according to the second embodiment.

Fig. 18 is an enlarged view of a portion of the apparatus for automatically exchanging the article in Fig. 17.

Detailed description will hereunder be given of a preferred embodiment of a method of automatically exchanging an article and an apparatus therefor according to the present invention with reference to the accompanying drawings.

As shown in Fig. 1, an apparatus 10 for automatically transferring an article of the first embodiment according to this invention has a main body 12 formed like a rectangular box. Plural lockers 14, a fee payment unit 16, an operation section 18, LED display section 20, a record section 22, a liquid crystal panel display section 24 and the like are located on the front of the main body 12.

The lockers 14 are set in line 9 by 3 on the front of the main body 12 and have doors 14A. The left end of each door 14A is supported rotatably on the front of the main body 12. Therefore, the door 14A can be opened and shut about the left end thereof. And, serial numbers 01, 02, 03... are inscribed on the respective doors 14A of the lockers 14. A lamp 14B is located on the locker 14 at the side of the door 14A.

The fee payment unit 16 is provided at the center of the main body 12 and including a coin payment section 16A and a paper payment section 16B. The operation section 18 is located at the left of the fee payment unit 16 and having a receiving button, a request button, a return button, a delayed take-out button and an end button not shown and a key-pad 18A for inputting. The LED display section 20 is provided above the operation section 18 and displays identification numbers and the like described later.

Moreover, the record section 22 is located under the operation section 18 and prints out information when necessary. The liquid crystal panel display section 24 is placed at the left of the operation section 18 and indicates operation procedure and the like.

Further, the control section 26 (see Fig. 2) is provided in the main body 12 and outputs control signals to the LED display section 20, the record section 22, the liquid crystal panel display section 24 and the like based on mainly the input signals from the operation section 18. Moreover, the control section 26 records information input from the operation section 18 and outputs the recorded information when necessary. Further, the control section 26 calculates a cleaning fee based on the pre-memorized fee for a shirt item.

Moreover, 30 indicates a change return section and 32 indicates a fluorescent light in Fig. 1.

The description will be given of the operation in the apparatus for automatically exchanging the article of the first embodiment constructed like the above-mentioned.

(1) The explanation will be given of a case that a shirt to be cleaned is received referring to the flow chart in Fig. 3.

First, the receiving button is pushed (step 50). As a result, receiving signals are input to the control section 26 and the control section 26 goes into the receipt operating state. At the same time, the liquid crystal panel display section 24 displays the operation procedure which the user needs to do based on the signals output from the control section 26.

The user inputs his telephone number with the input key 18A based on the operation procedure displayed on the liquid crystal panel display section 24 (Step 52). Thereafter, the input telephone number is accepted as an identification number. The LED display section 20 indicates the identification number based on the signal output from the control section 26. At the same time, the operation procedure which the user needs to do next is displayed on the liquid crystal panel display section 24 based on the signal output from the control section 26.

The user pushes the end button based on the operation procedure displayed on the liquid crystal panel display section 24 when there is no mistake about the operation (Step 54). The end signal of the end button is input to the control section 26. The control section 26 outputs the signal to stop displaying the identification number on the LED display section 20. The LED display section 20 stops the display of the identification number based on the signal. At the same time, the liquid crystal panel display section 24 indicates the operation procedure which the user needs to do next based on the signal output from the control section 26.

The user inputs the number of the shirts to be left by the input key 18A based on the operation procedure displayed on the liquid crystal panel display section 24 (Step 56). And, the input number of the shirts is input to the control section 26. The control section 26 outputs the signals indicating the number of shirts to the LED display section 20. At the same time, the control section 26 calculates the cleaning fee based on the number of shirts and the pre-memorized unit

price for one item. The calculated fee is displayed on the LED display section 20. Further, the liquid crystal panel display section 24 indicates the operation procedure which the user needs to do next, based on the signal output from the control section 26.

The user deposits the cleaning fee displayed on the LED display section 20 into the fee payment unit 16 based on the operation procedure displayed on the liquid crystal panel display section 24 (Step 58). In this case, notes can be used together with coins. The cleaning fee is deposited to the fee payment unit 16, and then, the liquid crystal panel display section 24 indicates the next operation procedure based on the signals from the control section 26.

The user pushes the request button based on the operation procedure displayed on the liquid crystal panel display section 24 (Step 60). When the request button is pushed, the request signals are input to the control section 26, and then, the control section 26 outputs lock release signals to a lock not shown and placed on the door 14A of the vacant locker 14 based on the request signals. As a result, the door 14A can be opened. In this case, the lamp 14B located next to the door 14A is turned on based on the lock release signals. Therefore, the user can distinguish the vacant locker 14 and the locker 14 which is not vacant. Further, the number of still vacant lockers 14 is memorized in the control section 26.

Moreover, the paid cleaning fee and the calculated cleaning fee are compared by the control section 26, and when there is change, the compared value is output to the change return section 30. The change is returned from the change return entrance of the change return

section 30 based on the compared value. Further, the control section 26 outputs print signals to the record section 22 based on the request signals. The record section 22 prints out "Account and Temporary receipt" based on the print signals. In this case, the locker number, the identification number, the request date, the request time, the number of the received shirts, the fee, the tag number, the treatment serial numbers, the apparatus number, the telephone number of the agency and the like are printed on "Account and Temporary receipt". The liquid crystal panel display section 24 indicates the next operation procedure based on the signals output from the control section 26.

The user opens one of the doors 14A, when the lamp 14B is turned on and puts and packs the shirt into the vinyl bag (not shown) prepared in the locker 14 based on the operation procedure indicated on the liquid crystal panel display section 24 (step 62). The shirt is packed, and then the door 14 is closed (step 64). In this case, the closed door 14 automatically goes into the locked state and the lock information is input to the control section 26. Moreover, the control section 26 memorizes all information about the steps 50-62.

(2) The explanation will be given of a case when the shirt is received by the locker 14 and is collected by the cleaning shop, the agency or the like referring to the flow chart in Fig. 4.

First, the key switch not shown is turned on (step 68). Then, the signal from the key switch is input to the control section 26 and the apparatus for automatically exchanging the article goes into the return operating state. Next, the return button (not shown) is pushed

(step 70). As a result, the signal output from the return button is input to the control section 26. In this case, the locker number receiving the shirts and the number of the received shirts are memorized in the control section 26, therefore, this information is displayed on the liquid crystal panel display section 24. Further, the tag number fixed to the shirt is displayed on the liquid crystal panel display section 24. The tag numbers are put on the respective shirts by the control section 26 when the locker 14 received them, thus, the control section 26 memorizes the information.

Therefore, the cleaning shop or the agency opens the door 14A of the locker number displayed on the liquid crystal panel 24 and picks the received shirts up (step 72). And, tags are fixed to the picked-up shirts based on the tag numbers indicated on the liquid crystal panel 24. In this case, the tags are classified by color and by mark to identify an area and an apparatus for automatically exchanging the article. The door 14 is shut after the shirt is picked up. Then, information showing that the locker number of the shut door 14A is vacant is input to the control section 26. After the shirts are taken out, the locker numbers and identification numbers are deleted. Next, a person can understand when the locker is free or in use (step 74). When the lockers have received shirts, the process of the steps 70-74 are repeated one by one until there are no more lockers receiving shirts (step 75).

When there are no more lockers receiving shirts, the end button is pushed (Step 76). As a result, the buzzer rings when the key switch operation begins, and further, the control section 26 outputs

the print signals to the record section 22 based on the signals output from the end button. The record section 22 prints out "Received Table" based on the print signals. In this case, the locker number, the identification number, the request date, the request time, the number of the received shirt, the fee, the tag number, the treatment serial numbers, the apparatus number, the telephone number of the agency and the like are printed on the "Received Table".

The key switch is turned off after printing out the "Received Table" (step 78). Therefore, the apparatus for automatically exchanging the article returns to the receiving state.

(3) The explanation will be given of a case when the shirt cleaned by the cleaning shop or the agency is stored in the locker referring to the flow chart in Fig. 5.

First, the key switch not shown is turned on (step 80). And, the signals from the key switch are input to the control section 26 at the same time, and then the apparatus for automatically exchanging the article goes into the storage operating state.

Next, the receiving button is pushed (step 82). As a result, the receiving signals are input to the control section 26 and the liquid crystal panel display section 24 indicates the vacant locker number based on the signals from the control section 26. The door 14A of the indicated vacant locker number is opened and the cleaned shirt is stored (step 84).

Further, the tag number is input with the key-pad 18A (step 86). The input tag number corresponding to the locker number storing the shirt is memorized in the control section 26. The steps 82-86 are

repeated one by one until all cleaned shirts are stored in the lockers (Step 87). The key switch is turned off after storing all cleaned shirts in the lockers (step 88). As a result, the apparatus for automatically exchanging the article returns to the receiving state.

(4) The explanation will be given of a case when the cleaned shirt is returned to the user referring to the flow chart in Fig. 6.

First, the return button (not shown) is pushed (step 92). As a result, the signals from the return button are input to the control section 26 and the apparatus for automatically exchanging the article goes into the state, whereby the shirts can be returned. At the same time, the liquid crystal panel display section 24 indicates the next operation procedure based on the signals from the control section 26.

The user inputs his identification number with the input key 18A based on the operation procedure displayed on the liquid crystal panel display section 24 (Step 94). The identification number input by the input key 18A is input to the control section 26 and the LED display section 20 shows the identification number based on the signals from control section 26. And, the tag number of the cleaned shirt stored in the locker is memorized in the control section 26, therefore, the control section 26 indicates the number of the locker 14 storing the user's shirt based on the memorized tag number and the identification number input by the input key 18A. That is, the lamp 14B located next to the locker 14 storing the user's shirt blinks.

At the same time, the control section 26 outputs the unlock signals to the lock not shown provided on the door 14A of the locker 14 in which the lamp 14B blinks. As a result, the door 14A in which

the lamp blinks can be opened. Moreover, the liquid crystal panel display section 24 indicates the next operation procedure based on the signals from the control section 26.

The user opens the door 14A in which the lamp 14B blinks and picks up the cleaned shirt stored in the locker 14 based on the operation procedure displayed on the liquid crystal panel display section 24 (step 96). Next, the door 14 is closed (step 64). In this case, the door 14 is closed by a mechanical mechanism and is locked automatically five seconds later. Moreover, the control section 26 memorizes the return date and prints out information such as the locker number, the identification number, the return date, the return time and the tag number when necessary. The apparatus for automatically exchanging the article returns to the receiving state after locking the door 14 or completing the print out. In this case, the door is shut after picking up the shirt, and then, the information showing that the locker of the shut door 14A is vacant is input to the control section 26. After the shirts are taken out, the locker numbers and identification numbers are deleted.

(5) The explanation will be given of a case that the cleaned shirt being delayed in the return is collected referring to the flow chart in Fig. 7.

First, the key switch not shown is turned on (step 100). Then, the signals from the key switch are input to the control section 26 at the same time, and the apparatus for automatically exchanging the article gets into the delay operating state.

Next, the delayed take-out button is pushed (step 102). As a

result, the delay take-out signals are input to the control section 26. In this case, the date when the cleaned shirt is stored in the locker 14 is memorized in the control section 26. Therefore, the control section 26 outputs the signals showing the delayed locker number to the liquid crystal panel display section 24 when the storage period exceeds a predetermined period. The liquid crystal panel display section 24 displays the delayed locker number based on the signals from control section 26.

At the same time, the control section 26 outputs the unlock signals to the lock (not shown) on the door 14A of the delayed locker based on the delayed take-out. As a result, the door 14A of the delayed locker indicated on the liquid crystal panel 24 can be opened. Moreover, the delayed time can be set to an accuracy of one hour.

Next, the openable door 14A of the delayed locker 14 is opened and the shirt stored in the delayed locker 14 is taken out (step 104). The steps 102-104 are repeated one by one until all left over shirts are collected from the locker (Step 105). The end button is pushed after all delay shirts are collected from the lockers (step 106). As a result, a table of the collected left-over-shirts is printed out. The key switch is turned off after printing out the table (step 108). Therefore, the apparatus for automatically exchanging the article returns to the receiving state.

In the above-mentioned embodiment, the description has been given of the case in that cash or coins are deposited to the fee payment unit 16 as the cleaning fee indicated on the LED display section 20 based on the operation procedure displayed on the liquid crystal panel

display section 24. However, this invention will not be limited to this, the indicated cleaning-fee may be paid by a pre-paid card, a credit card or the like. In this case, an opening for receiving the pre-paid card, the credit card or the like is formed and a reading means or the like for reading the pre-paid card, the credit card or the like is provided with the apparatus for automatically exchanging the article. Moreover, the apparatus for automatically exchanging the article may be constructed in such a way as the fee can be paid both by cash and by card, or such as the fee must be paid only by cash or card.

In the above-mentioned embodiment, the apparatus for automatically exchanging the article is applied to cleaning shirts. However, this invention will be not limited to this, it may be applied to other articles.

Next, the detailed description will be given of a second embodiment of an apparatus for automatically exchanging an article according to this invention.

As shown in Fig. 8, an apparatus 310 for automatically exchanging has a main body 312 formed like a rectangular box, as well as the first embodiment. Plural lockers 314, an operation unit 315, a print record section 322 and the like are located on the front of the main body 312.

The plural lockers 314 are set on the front of the main body 312 and have doors 314A and lamps 314B are located at the respective left sides thereof.

The operation unit 315 is placed in the right side of the main body 312 as shown in Fig. 9 and provided with a fee payment section 316, button operation sections 318A and 318B and a display section 320. The fee payment section 316 has a coin payment section 316A and a paper payment section 316B. The button operation sections 318A and 318B are located at the left of and under the fee payment section 316. The button operation section 318A located at the left of the fee payment section 316 has a glossy button 319A, a silk-finish button 319B, and a panorama button 319C, and under these buttons a service size button 319D, a business card size button 319E and a wallet size button 319F are located. Further, a receiving mode button 321A and a return mode button 321B are provided. Moreover, a processing mode button is arranged on the back of the main body 312 not shown.

The button operation section 318B under the fee payment section 316 has key-pad 319G for inputting and an end button 319H. Moreover, a display section 320 is located at the left side of the button operation section 318B under the fee payment section 316, and displays the operation procedures in receiving and return and the like are indicated. The print record section part 322 is located under the operation unit 315 and prints out information when necessary.

Further, the control section 326 (see Fig. 10) is provided in the main body 312. The control section 326 mainly outputs the control signals to the display section 320, the print record section 322 and the like based on the input signals from the button operation sections 318A and 318B. Moreover, the control section 326 records the

information input from the operation section 318A and 318B, and then the recorded information is output when necessary.

Moreover, reference 550 in Fig. 10 is a temperature control unit. The temperature control unit 550 keeps the temperature in the lockers 314, 314...constant. With this arrangement, the quality of the printed photograph is protected. Further, reference 330 in Fig. 8 is a change return section.

The description will be given of the operation in the apparatus for automatically exchanging the article of the second embodiment constructed like the above-mentioned.

(1) The explanation will be given of a case in which films are received in referring to the flow chart in Fig. 11.

First, the receiving button 321A is pushed (step 350). As a result, the receiving signals are input to the control section 326 and the control section 326 goes into the state of the receiving operation. At the same time, the display section 320 indicates the operation procedure which the user needs to do next based on the signals output from the control section 326.

The user pushes the glossy button 319A or the silk-finish button 319B based on the operation procedure indicated on the display section 320 so as to select the printing condition between glossy and silk-finish. Moreover, the panorama button 319C is pushed to specify the panorama processing when a picture has been taken in the panorama size. Further, one of the service size button 319D, the business card size button 319E and the wallet size buttons 319F is pushed to specify the photograph size from among the service size, the business card

size and the wallet size. The display section 320 displays the printing condition, the panorama processing, the photograph size and the like input by the button, and further displays the return date. At the same time, the display section 320 indicates the operation procedure which the user needs to do next based on the signals output from the control section 326 (step 352).

Next, the user inputs his telephone number by the input key 319G based on the operation procedure indicated on the display section 320 (Step 354). Thereafter, the input telephone number is handled as an identification number. The display section 320 displays the identification number based on the signal output from the control section 326, at the same time displays the operation procedure which the user needs to do next.

The user pushes the end button 319H when there is no mistake in the operation (Step 356). When the end button is pushed, the end signals are input to the control section 326. And then, the control section 326 outputs the signal for stopping the display of the identification number to the display section 320. The display section 320 is stopped from displaying the identification number based on the signal. Moreover, as soon as the end button is pushed, the request signals are input to the control section 326 and the lamp 314B of the vacant locker 314 is lit or blinked based on the request signals. Therefore, the user can distinguish the vacant locker 314 from the not vacant locker 314 (Step 358). Moreover, the number of the vacant locker 314 is always memorized in the control section 326.

Further, the control section 326 outputs the unlock signals to

the lock (not shown) provided with the door 314A in which the lamp 314B is lit or blinked. As a result, the door 314A can be opened. At the same time, the operation procedure which the user needs to do next is indicated on the display section 320 based on the signals output from the control section 326.

Next, the user opens the desired door 314A from among the doors 314A on which lamp 314B is lit or blinked based on operation procedure, and puts the films requiring the development, printing and the like into the locker 314 (step 360). And, the door 314A are closed after storing the films requesting development, printing and the like into the locker 314 (step 362). In this case, the closed door 314A automatically is locked and the lock information is input to the control section 326. Moreover, all information about the steps 350-362 is memorized in the control section 326.

When the door 314A is locked, the print signals are input to the control section 326 at the same time, and then the control section 326 outputs the print signals to the record section 322 based on the print. The record section 322 prints out a "Temporary receipt" based on the print signals. The glossy or silk-finish printing condition, the panorama processing and the photograph size among from the service size, the business card size and the wallet size are printed on the "Temporary receipt". Further, the number of the Locker storing the films requesting development, printing and the like, the identification number, the request date, the request time, the receipt date, the telephone number of the agency and the like are printed on the "Temporary receipt" (step 364). And, the door 314A is

closed after storing the films (step 364).

(2) The explanation will be given of a case that films stored in the locker 314 are collected by the photograph shop or the agency in referring to the flow chart in Fig. 12.

First, the key switch not shown is turned on (step 368). When the key switch is turned on, the signal from the key switch is input to the control section 326, and then the apparatus for automatically exchanging the article goes into the state of the return operation. Next, the processing button not shown is pushed (step 370). As a result, the signals output from the processing button are input to the control section 326. In this case, the number of the locker receiving the films, the identification number and other information are memorized in the control section 326, therefore, the information is displayed on the display section 320 and is printed out at the same time (step 372).

Therefore, the door 314A of the locker number displayed on the display section 320 or printed out is opened by the photograph shop or the agency, and then the stored films are taken out (step 374). And, the print sheet with the locker number is attached to the taken-out films (step 376). In this case, the print sheet with the locker number is classified by color and has a mark so as to specify the area and the apparatus for automatically exchanging the article. And, when the door 314A is closed after picking up the films, the information showing that the locker of the closed door 314A is vacant is input to the control section 326.

Next, it is verified whether there are lockers which have received films or

not (step 378). When lockers have received films, the steps 370-376 are repeated until there is no locker receiving films. And, when there is no locker receiving films, the end button is pushed (Step 380). With this arrangement, the buzzer indicating the start of the key switch operation rings, and further, the control section 326 outputs the print signals to the record section 322 based on the signals output from the end button. The record section 322 prints out a "Received Table" based on the print signals. In this case, the locker number, the identification number, the request date, the request time, the telephone number of the agency and the like are printed on the "Received Table".

The key switch is turned off after printing the "Received Table" (step 382). As a result, the apparatus for automatically exchanging the article returns into the receiving state.

(3) The explanation will be given of a case that developed films and printed photographs are stored in the locker by the photograph shop or the agency in referring to the flow chart in Fig. 13.

First, the key switch not shown is turned on (step 386). When the key switch is turned on, the signals from the key switch are input to the control section 326 at the same time, and then, the apparatus for automatically exchanging the article goes into the state of the storage operation.

Next, the receiving button is pushed (step 388). As a result, the receiving signals are input to the control section 326 and the liquid crystal panel display section 324 displays the vacant locker number based on the signals from the control section 326. The doors 14A of

the displayed vacant locker numbers are opened one by one to store the developed films and the printed photographs (step 390).

Further, the identification number and the fee are input with the key-pad 318A (step 392). The input identification number, which corresponds to the locker number storing the developed film and the printed photograph, is memorized in the control section 326 (Step 394). And, the steps 388-394 are repeated one by one until all the developed films and the printed photographs are stored in the locker (Step 396). The key switch is turned off after storing all the developed films and the printed photograph in the locker (step 398). As a result, the apparatus for automatically exchanging the article returns in the receiving state.

(4) The explanation will be given of a case that developed films and printed photograph are returned to the user in referring to the flow chart in Fig. 14.

First, the return button not shown is pushed (step 400). As a result, the signals from the return button are input to the control section 326, and then the apparatus for automatically exchanging the article goes into the state that the developed films and the printed photographs can be picked up. At the same time, the display section 320 indicates the next operation procedure based on the signals from the control section 326.

The user inputs his identification number with the input key 319G based on the operation procedure displayed on the display section 320 (Step 402). The identification number input with the input key 319G is input to the control section 326 and the display section

320 indicates the identification number and the fee based on the signals from the control section 326 (step 404). Next, the indicated fee is paid through the coin payment section 316A and the paper payment section 316B in the fee payment section 316 by the user based on the operation procedure displayed on the display section 320 (Step 406).

The paid fee and the displayed fee are compared by the control section 326, and then the change is returned from the change return section 330 when there is change. Further, the control section 326 outputs the print signals to the record section 322 based on the fee-paid signals. The record section 322 prints out a "Receipt" based on the print signals. In this case, the fee, the telephone number of the agency and the like are printed on the "Receipt".

And, the identification number corresponding to the locker number storing the developed films and the printed photograph is memorized in the control section 326, therefore, the control section 326 indicates the number of the locker 314 storing the user's developed films and printed photographs based on the memorized locker number and the identification number input from the input key 319G. Therefore, the lamp 314B, which is located next to the locker 314 storing the user's developed films and printed photograph, blinks (Step 408).

At the same time, the control section 326 outputs the unlock signals to the lock (not shown) placed on the door 314A of the locker 314 in which the lamp 314B is blinking. As a result, the door 314A in which the lamp is blinking can be opened. The display section 320 displays the next operation procedure based on the signals from the

control section 326.

The user opens the door 314A in which the lamp 314B is lit and picks up the developed films and the printed photographs stored in the locker 314 based on the operation procedure displayed on the display section 320 (step 410). Next, the door 314A is closed (step 364). In this case, the door 314A is closed by a mechanical mechanism and is locked automatically after five seconds. Moreover, the control section 326 memorizes the return date, and prints out the information including the locker number, the identification number, the return date and the return time when necessary. The apparatus for automatically exchanging the article returns into the receiving state after locking the door 314 or after printing out. In this case, when the door 314A is shut after the developed films and the printed photographs are taken out, the information showing that the locker number of the shut door 314A indicates a vacant locker is input to the control section 326.

(5) The explanation will be given of a case when developed films and printed photographs in which the return is delayed are collected in referring to the flow chart in Fig. 15.

First, the key switch not shown is turned on (step 414). When the key switch is turned on, the signals from the key switch are input to the control section 326 at the same time, and then, the apparatus for automatically exchanging the article gets into the state of the delay operation.

Next, the delayed take-out button is pushed (step 416). As a result, the delayed take-out signals are input to the control section

326. In this case, the date when the developed films and the printed photograph were stored in locker 314 is memorized in the control section 326, therefore, the control section 326 outputs signals indicating the delayed locker number to the display section 320 when the storage period exceeds the predetermined period. The display section 320 displays the delayed locker number based on the signals from the control section 326.

At the same time, the control section 326 outputs the unlock signals to the lock (not shown) on the door 314A of the delayed locker displayed on the liquid crystal panel 324 based on the delayed taking out. As a result, the door 314A of the delayed locker displayed on the display section 320 can be opened. Moreover, the delay time can be set by one hour.

Next, the door 314A which can be opened of the delayed locker 314 is opened and the developed films and the printed photographs stored in the delayed locker are taken out (step 418). Further, the identification number of the delayed developed-films and the delayed printed-photographs are input when the developed films and printed photograph stored in the delayed locker 314 are collected (step 420). As a result, the identification number of the delayed developed-films and the delayed printed-photographs are extinguished from the control section 326. And, the steps 416-420 are repeated one by one until all the delayed developed-films and the delayed printed-photographs are collected from the locker (Step 422). The end button is pushed after collecting all the delayed developed-films and the delayed printed-photographs from the locker (step 424). As a result, a table of the

collected delay developed-films and printed photographs is printed out. The key switch is turned off after printing out the table (step 426). As a result, the apparatus for automatically exchanging the article returns to the receiving state.

In the above-mentioned embodiment, the description has been given of the glossy button 319A, the silk-finish button 319B, and the panorama button 319C provided in the button operation section 318A of the operation unit 315, and the service size button 319D, the business card size button 319E and the wallet size button 319F are provided under the buttons 319A, 319B and 319C. However, this invention will not be limited to this. Eg. an operation unit 500 may be constructed with buttons for inputting omitted as shown in Fig. 16(A), as a result of which, the processing is specified with the input key-pad 319G of the button operation section 318B from among the glossy, the silk-finish, the panorama size, the service size, the business card size and the wallet size.

Moreover, in the above-mentioned embodiment, the description has been given of where the telephone number is input with the key-pad 319G as an identification number. However, this invention will not be limited to this, eg. an identification number pre-recorded in a member card may be read.

Fig. 16(B) shows an operation unit 502 in which the member card can be used. Reference 504 shows an insertion entrance for the member card.

Further, a vending machine may be established as an annex to an apparatus 510 for automatically exchanging an article as shown in Fig. 17. In this case, slots 316A and 316B for the development and the printing are used as a slot for buying films. Moreover, reference 512 is an opening for taking out films in Fig. 17. Fig. 18 shows an operation unit 514 in a case that a vending machine is established as an annex to the apparatus for

automatically exchanging the article. The operation unit 514 is provided with a film purchase button 516, and buttons 518 and 520 for changing the number of exposures. 24 exposures are selected with the button 518 and 36 are selected with the button 520. The film purchase button 516 changes from the automatically exchanging to the film sales.

In the above-mentioned embodiment, the description has been given of where the user pays fees in cash. However, this invention will not be limited to this, eg. the fees for the development, the printing and/or the automatic vending of films can be paid by a pre-paid card, a credit card and the like. In this case, a slot for receiving the pre-paid card, the credit cards or the like is formed and a reading means for reading the pre-paid card, the credit cards or the like is provided. Moreover, the apparatus for automatically exchanging the article may be constructed so the payment can be made by both cash and card, or by just one of them.

In the above-mentioned embodiment, the description has been given of the apparatus for automatically exchanging the article having functions; 1) receiving films, 2) picking up, 3) storage, 4) return and 5) delayed return. However, this invention will not be limited to this, eg. the apparatus for automatically exchanging the article having 1) receiving films and 2) picking up functions may be used. In this case, the films are picked up through the apparatus for automatically exchanging the article and the developed films and the printed photographs are returned to the person directly from the photograph shop and the like.

In the above-mentioned embodiment, the description has been given of a case that the apparatus for automatically exchanging the article is used for the development and the print of the films, however, this invention will not be limited to this and can be applied to other articles.

Moreover, in the above-mentioned embodiment, the description has been given of a case that the fee is memorized when the article processed in the selected finish is stored in a vacant locker, and then the user pays the fee when the article is returned, however, this invention will not be limited to this, and the method of automatically exchanging the article according to this invention may be also applied to the advance payment when the fee is known previously depending on the handled articles.

As above described, according to the method of automatically exchanging the article of the illustrated embodiments, the control section automatically indexes a vacant locker by inputting the identification number and memorizes the vacant locker storing the article and the identification number under the receiving mode, and further, outputs the display signals of the identification number when the locker is opened. Moreover, under the return mode, the control section memorizes the number of a new vacant locker in which the article is stored and the identification number, and then automatically indexes the new locker corresponding to the identification number in which the article is stored based on the identification number. And, the display means displays the identification number corresponding to the opened locker based on the display signals from the control section.

With this arrangement, the article can be left with a predetermined person and returned from the predetermined person through the apparatus for automatically exchanging the article, therefore, the article can be exchanged at any time. Therefore, a dual-income family, a single person or the like can leave articles to the predetermined person and can pick them up from the predetermined person outside working hours.

Moreover, according to the method automatically exchanging the article and the apparatus therefor of at least preferred embodiments, a locker can be used for receiving and for return, therefore, the vacant locker of the apparatus for automatically exchanging can be efficiently used.

As above described, in at least preferred embodiments the article can be left with a predetermined person and returned from the predetermined person through the apparatus for automatically exchanging the article, therefore, the article can be exchanged at any time.

Therefore, a dual-income family, a single person or the like can leave articles to the predetermined person and can pick them up from the predetermined person outside working hours.

Moreover, according to the method automatically exchanging the article and the apparatus therefor of at least preferred embodiments, a locker can be used for receiving and for return, therefore, the locker to be used can be freely selected under the receiving mode and the return mode. Therefore, the vacant locker of the apparatus for automatically exchanging can be efficiently used.

Moreover, in preferred embodiments, the fee is memorized when the article processed in the selected finish is stored in the vacant locker, the fee is displayed on the display section when the user inputs the identification number and the door of the vacant locker storing the article processed in the selected finish is unlocked when the displayed fee is deposited.

Therefore, this invention can be applied to the article in which the fee becomes clear after processing.

It should be understood, however, that there is no intention to limit the invention to the specific forms

disclosed, but on the contrary, the invention is to cover all modifications, alternate constructions and equivalents falling within the spirit and scope of the invention as expressed in the appended claims.



CLAIMS:

1. A method of exchanging an article from a first person to a second person through a locker means, comprising:

setting said locker means into a receiving mode in which an article to be exchanged can be deposited;

inputting a user identification code to access a vacant locker and placing said article in the locker;

memorizing in said locker means the identity of said vacant locker in which the article is left, and said user identification code;

setting said locker means into a mode in which the locker can be opened for the article to be collected by said second person; and

outputting said user identification code during accessing of said locker by said second person.

2. A method of exchanging an article as claimed in claim 1, further comprising the steps of:

setting said locker means into a return mode in which said article can be returned to said first person;

inserting said article into a new vacant locker and memorizing in said locker means the identity of said new locker and said user identification code; and

accessing said new locker on entering of said user identification code.

3. A method of exchanging an article as claimed in claim 1 or 2, further comprising displaying a fee on deposit of said article.

4. A method of exchanging an article as claimed in claim 2, further comprising memorizing a required fee in said return mode; requesting said fee in response to an input of the user identification code; and accessing said new locker on deposit of said fee.



5. A method of exchanging an article as claimed in claim 3 or 4, wherein a deposit of said specified fee is performed by cash.

6. A method of exchanging an article as claimed in claim 3 or 4, wherein a deposit of said specified fee is performed by a card such as a prepaid card or a credit card.

7. A method of exchanging an article as claimed in any preceding claim, further comprising inputting information when leaving said article; memorizing said information with said user identification code; and outputting said information with said code during opening of the locker.

8. A method of exchanging an article as claimed in any preceding claim, further comprising displaying a received date or a return due date on the basis of memory contents when said article is deposited in said locker, and outputting a said date when said article is collected by said second person.

9. A method of exchanging an article as claimed in any preceding claim, wherein the temperature of said locker is controlled.

10. A method of automatically exchanging an article, wherein the article can be left with a predetermined person through a locker and the article can be taken up from the predetermined person through the locker, comprising:

a step of setting a receiving mode;

a step of inputting a user identification code to automatically index a vacant locker;

a step of memorizing a number of a vacant locker, in which the article is left, and said user identification code;



a step of outputting a display signal of said user identification code during the opening of a locker and displaying said user identification code in response to an output signal;

a step of setting a return mode;

a step of memorizing a number of a new vacant locker, in which the article is left, and said user identification code; and

a step of automatically indexing the new locker, in which is left the article corresponding to said user identification code, on the basis of said user identification code.

11. A method of automatically exchanging an article, wherein the article can be left with a predetermined person through a locker and the article can be taken up from the predetermined person through the locker, comprising:

a step of setting a receiving mode;

a step, in which a user makes an input for leaving the article and an input of a user identification code to automatically index a vacant locker;

a step of displaying a fee for an article to be left and unlocking a door of a vacant locker;

a step of memorizing a number of a vacant locker, in which the article is left, and said user identification code;

a step of outputting a display signal of said user identification code during the opening of a locker and displaying said user identification code in response to an output signal;

a step of setting a return mode;

a step of memorizing a number of a new vacant locker, in which the article is left, and said user identification code; and

a step of automatically indexing a new locker, in which is left the article corresponding to said user



identification code, on the basis of said user identification code.

12. A method of automatically exchanging an article, wherein the article can be left with a predetermined person through a locker, comprising:

- a step of setting a receiving mode;

- a step, in which a user makes an input of information to be left with the article and an input of a user identification code to automatically index a vacant locker;

- a step of memorizing a number of a vacant locker, in which the article is left, said information to be left with the article and a user identification code;

- a step of displaying and printing contents of memory and a take-up date on the basis of the memory contents;

- a step of setting a processing mode; and

- a step of displaying and printing a number of a locker, in which the article is left, said memory contents and a return date.

13. A method of automatically exchanging an article, wherein the article can be left with a predetermined person through a locker and the article can be taken up from the predetermined person through the locker, comprising:

- a step of setting a receiving mode;

- a step, in which a user makes an input of information to be left with the article and an input of a user identification code to automatically index a vacant locker;

- a step of memorizing a number of a locker, in which the article is left, information to be left with the article and a user identification code, and displaying and printing a return date;

- a step of setting a processing mode;



a step of displaying and printing information left with the article and the user identification code during an opening of a locker;

a step of setting a return mode;

a step of memorizing a number of a new locker, in which a finished product is stored, said user identification code and a requested fee; and

a step of automatically indexing a new locker, in which a finished product corresponding to a user identification code is stored when said requested fee is deposited in response to an input of the user identification code.

14. Apparatus for exchanging an article between a first person and a second person, comprising:

locker means provided with a plurality of lockers;

control means interchangeable between a receiving mode in which an article can be left in a locker, and a mode in which the locker can be opened for the collection of said article, said control means being adapted in said receiving mode to memorise a user identification code and the identity of a locker in which an article is left, and to output said user identification code during the accessing of said locker by said second person;

input means for putting said locker means into a receiving mode and into a mode in which the article can be collected and for inputting said user identification code; and

output means for outputting a user identification code in response to an output signal from said control means.

15. Apparatus for exchanging an article as claimed in claim 14, wherein said control means includes a return mode in which said article is returnable to the user, said control means being adapted to memorise the user



identification code and the number of a new vacant locker in which the article is placed in said return mode, and to open said new locker on entering of said user identification code.

16. Apparatus for exchanging an article as claimed in claim 14 or 15, wherein said control means, in the receiving mode, displays a fee for an article to be left when a user inputs a user identification code, and releases a vacant locker when the specified fee is deposited.

17. Apparatus for exchanging an article as claimed in claim 15, wherein, in the return mode a required fee is memorised by said control means when the article is redeposited in a new vacant locker, and wherein means are provided for opening said new locker when said user identification code is input and when said required fee is deposited.

18. Apparatus for exchanging an article as claimed in claim 16 or 17, wherein a deposit of said specified fee is performed by cash.

19. Apparatus for exchanging an article as claimed in claim 16 or 17, wherein a deposit of said specified fee is performed by a card such as a prepaid card or a credit card.

20. Apparatus for exchanging an article as claimed in any of claims 14 to 19, wherein said input means are adapted to input information to be left with said article, and said control means are adapted to memorise said information and to output said information through said output means when the locker is accessed by said second person.



21. Apparatus for exchanging an article as claimed in any of claims 14 to 20, wherein said control means is adapted to output a date of receipt and/or return due date.

22. Apparatus for exchanging an article as claimed in any of claims 14 to 21, wherein said output means includes a display means.

23. Apparatus for exchanging an article as claimed in any of claims 14 to 22, further provided with temperature control means.

24. An apparatus for automatically exchanging an article, wherein the article can be left with a predetermined person through a locker and the article can be taken up from the predetermined person through the locker, characterized in that said apparatus comprises:

- a main body of said apparatus for automatically exchanging an article, provided thereon with a plurality of lockers;

- a control section constructed so as to be changed from a receiving mode to a return mode and vice versa, in which, under the receiving mode, a user identification code is input to automatically index a vacant locker, a number of the vacant locker, in which the article is left, and said user identification code are memorized, and further, a display of said user identification code is output during the opening of a locker, and, under the return mode, a number of a new vacant locker, in which the article is left, and said user identification code are memorized, and a new locker, in which the article corresponds to said user identification code, is automatically indexed on the basis of said user identification code;

- an input means capable of inputting the receiving



mode, the return mode and the user identification code;
and

a display means for displaying a user identification code corresponding to an opened locker in response to a display signal from the control section; whereby said locker is additionally used as a receiving locker or a return locker.

25. An apparatus for automatically exchanging an article, wherein the article can be left with a predetermined person through a locker and the article can be returned from the predetermined person through the locker, characterized in that said apparatus comprises:

a main body of said apparatus for automatically exchanging an article, provided thereon with a plurality of lockers;

a control section constructed so as to be changed over from a receiving mode to a processing mode and vice versa, in which, under the receiving mode, information to be left with the article and a user identification code are input to automatically index a vacant locker, a number of a vacant locker, in which the article is left, the information to be left and said user identification code are memorized, and display signals of the memory contents and a return date are output on the basis of the memory contents, and, under the processing mode, display signals of the number of the locker, in which the article is left, said user identification code and said return date are output;

an input means capable of inputting the receiving mode, the processing mode, the information to be left and the user identification code;

a display means for displaying the information to be left and the user identification code corresponding to the opened locker in response to a display signal from the control section;



whereby said locker is additionally used as a locker for receiving or a locker for processing.

26. An apparatus for automatically exchanging an article, wherein the article can be left with a predetermined person through a locker and the article can be taken up from the predetermined person through the locker, characterized in that said apparatus comprises:

- a main body of said apparatus for automatically exchanging an article, provided thereon with a plurality of lockers;

- a control section constructed so as to be changed over between a receiving mode, a processing mode and a return mode, in which, under the receiving mode, information to be left with the article and a user identification code are input to automatically index a vacant locker, a number of a locker, in which the article is left, the information to be left and said user identification code are memorized and a display signal of a return date is output, and further, under the processing mode, display signals of the information to be left and said user identification code are output during the opening of the locker, and, under the return mode, a number of a new vacant locker, in which a finished product is stored, said user identification code and a requested fee are memorized, and, when said requested fee is thrown in on the basis of said user identification code, the new locker, in which the finished product corresponds to said user identification code is automatically indexed;

- an input means capable of inputting the receiving mode, the processing mode, the return mode, the information to be left and the user identification code; and

- a display means for displaying the information to be left and the user identification code corresponding



to the opened locker in response to a display signal from the control section;
whereby said locker is additionally used as a locker for receiving or a locker for return.

27. A method of exchanging an article, substantially as hereinbefore described, with reference to Figs. 1 to 7 of the accompanying drawings.

28. A method of exchanging an article, substantially as hereinbefore described, with reference to Figs. 8 to 18 of the accompanying drawings.

29. Apparatus for exchanging an article, substantially as hereinbefore described, with reference to Figs. 1 to 7 of the accompanying drawings.

30. Apparatus for exchanging an article, substantially as hereinbefore described, with reference to Figs. 8 to 18 of the accompanying drawings.