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(54) Commodity information registering apparatus

(57) There is disclosed a commodity information registering apparatus which registers commodity information while a commodity (41) is moved, comprising a radio tag reading section (21) which reads a radio tag (32) within a first field (44) to acquire commodity identification information stored in the radio tag (32), an optical reading section (19) which reads a code symbol (33) within a second field to acquire commodity identification information described in the code symbol (33), and a registering section (25) which registers one of the commodity information corresponding to the commodity identification information acquired from the radio tag (32) and the commodity information corresponding to the commodity identification information acquired from the code symbol (33).

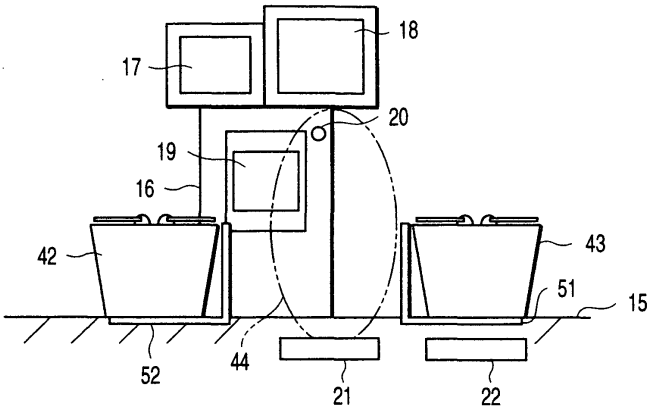


FIG. 6

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Description

[0001] The present invention relates to commodity information registering apparatus and method in which commodity identification information is read, from a radio tag (for example radio frequency identification tag), a code symbol or the like, and commodity information corresponding to the commodity identification information is registered. A radio frequency identification tag is called RFID tag for short.

[0002] Commodity information registering apparatuses are provided with input devices for inputting commodity identification information such as identification data, sales prices, and manufacturing dates of commodities. The commodity identification information is sometimes described as barcode information in barcodes attached to the commodities, or stored as data carrier information in data carriers attached to the commodities.

When the commodity identification information is the barcode information, a barcode reader is used as the input device. This barcode reader irradiates the barcode with light, and receives the reflected light to thereby acquire the commodity identification information. The commodity identification information is the data carrier information, a data carrier reader is used as the input device. This data carrier reader reads the data carrier information carried by a carrier wave oscillated from the data carrier by radio, and acquires the commodity identification information (see, e.g., Jpn. Pat. Appln. KOKAI Publication No. 11-66435).

[0003] Additionally, when the commodity provided with a radio tag is registered, the radio tag needs to be moved to a reading field of a radio tag reader. Therefore, in a store in which commodities provided with the barcodes and the radio tags, those provided with the barcodes only, and those provided with the radio tags only exist in a mixed manner, an operator who registers the commodities confirms presence of the radio tags. When there is the radio tag, the radio tag has to be moved to the reading field of the radio tag reader.

[0004] An object of the present invention is to provide a commodity information registering apparatus in which information from a radio tag or a code symbol can be read to register a commodity, while an operator who registers a commodity is moving the commodity with respect to a radio tag reading section and an optical reading section.

[0005] To solve the above-described problem and achieve the object, commodity information registering apparatus of the present invention is constituted as follows.

[0006] A commodity information registering apparatus which registers commodity information while a commodity is moved, comprising a radio tag reading section which reads a radio tag within a first field to acquire commodity identification information stored in the radio tag; an optical reading section which reads a code symbol within a second field to acquire commodity identification information described in the code symbol; and a registering section which registers one of the commodity information corresponding to the commodity identification information acquired from the radio tag and the commodity information corresponding to the commodity identification information acquired from the code symbol.

[0007] According to the present invention, a radio tag or a code symbol is read to acquire commodity identification information, while a commodity is moved.

[0008] This summary of the invention does not necessarily describe all necessary features so that the invention may also be a sub-combination of these described features.

[0009] The invention can be more fully understood from the following detailed description when taken in conjunction with the accompanying drawings, in which:

FIG. 1 is an appearance diagram of a commodity information registering apparatus according to a first embodiment of the present invention;

FIG. 2 is a block diagram of the commodity information registering apparatus according to the embodiment;

FIG. 3 is an appearance diagram of a radio tag and a barcode attached to a commodity according to the embodiment;

FIG. 4 is an explanatory view of commodity-information reading according to the embodiment;

FIG. 5 is a flowchart showing commodity-information registration according to the embodiment;

FIG. 6 is an explanatory view of the commodity-information reading according to the embodiment;

FIG. 7 is an explanatory view of the commodity-information reading according to a second embodiment of the present invention;

FIG. 8 is an explanatory view of the commodity-information reading according to a third embodiment of the present invention;

FIG. 9 is a block diagram of a barcode reading section according to the embodiment;

FIG. 10 is an explanatory view of an analog electric signal of a light receiving section according to the embodiment;

FIG. 11 is a flowchart showing the commodity-information registration according to the embodiment;

FIG. 12 is an explanatory view of the commodity-information reading according to a fourth embodiment of the present invention; and

FIG. 13 is an explanatory view of the commodity-information reading according to a fifth embodiment of the present invention.

[0010] First to fifth embodiments of the present invention will be described hereinafter in detail with reference to the drawings.

(First Embodiment)

[0011] First, a first embodiment will be described with reference to FIGS. 1 to 6. FIG. 1 is an appearance diagram of a commodity information registering apparatus according to the present embodiment. As shown in FIG. 1, a point of sales (POS) terminal 11 comprises: a display section 12 for a customer; a terminal display section 13 for an operator who registers commodities; and a terminal input section 14 as a keyboard in which a key for finishing the registration and the like are arranged.

[0012] Reference numeral 15 denotes a commodity laying table. A stationary scanner 16 is substantially vertically disposed substantially in a center of the commodity laying table 15. The stationary scanner 16 is provided with: a scanner display section 17 which displays commodity information corresponding to commodity identification information, on reading the commodity identification information including, for example, a commodity identification code, a sales price, an expiry date and the like of the commodity; a scanner input section 18 which is a keyboard for commodity registration; a barcode reading section (optical reading section) 19 which optically reads code symbols such as a barcode and a two-dimensional code attached to the commodity; and a loudspeaker 20 which informs the operator that the commodity registration is completed or there is an error at a time of the registration of the commodity information.

[0013] On one surface of a main body of the stationary scanner 16, there is disposed a reading field of the barcode reading section 19. Inside the commodity laying table 15, there are disposed: a radio tag reading section 21 which communicates with a radio tag attached to the commodity to read the commodity identification information; and a sensor section 22 which detects that a basket containing commodities (commodities before registered) purchased by the customer has been placed on the commodity laying table 15.

[0014] The radio tag reading section 21 is provided with an antenna (not shown). The radio tag reading section 21 is disposed in an upstream position from the barcode reading section 19 with respect to a moving direction of the commodity. The sensor section 22 is disposed in the upstream position from the barcode reading section 19 and the radio tag reading section 21 with respect to the moving direction of the commodity.

[0015] The customer stands on a side opposite to the POS terminal 11 with respect to the commodity laying table 15. Moreover, the customer places the basket containing the commodities before registered in a place of the commodity laying table 15 where the sensor section 22 is disposed, and moves toward the POS terminal 11 to perform settlement of purchase prices. The operator stands on the other side with respect to the commodity laying table 15.

[0016] FIG. 2 is a block diagram of the commodity information registering apparatus according to the present embodiment. As shown in FIG. 2, the POS terminal 11 is provided with: a control section 23 which operates in accordance with a pre-stored program; the display section 12 for the customer; the terminal display section 13; the terminal input section 14; a database section 24 in which the commodity identification information and the corresponding commodity information are stored; and a registering section 25 in which the commodity identification information and the registered commodity information are stored.

[0017] The control section 23 is connected to all of the display section 12 for the customer, the terminal display section 13, the terminal input section 14, the database section 24, the registering section 25, the scanner input section 18, the scanner display section 17, the radio tag reading section 21, the barcode reading section (optical reading section) 19, the loudspeaker 20, and the sensor section 22. All functions are controlled in accordance with a program stored in the control section 23.

[0018] FIG. 3 is an appearance diagram of the radio tag and the barcode attached to the commodity according to the present embodiment. As shown in FIG. 3, a radio tag 32 and a barcode 33 are attached to an outer side surface of a commodity package 31. Since the barcode 33 is optically read, it needs to be disposed outside the commodity package 31. However, since the radio tag 32 is read using an electromagnetic wave, the tag may be attached to the inside of the commodity package 31 unless the commodity package 31 is made of a material that interrupts the electromagnetic wave.

[0019] In the barcode 33, a country number, a maker number, an item code, and a check digit are described as the commodity identification information. In addition to the same information as that described in the barcode 33, a serial code for managing the commodity 31 separately from another commodity is stored as the commodity identification information in the radio tag 32.

[0020] It is to be noted that the code symbol like the two-dimensional code may be used instead of the barcode. In this case, the optical reading section 19 corresponding to the code symbol may be used, and the commodity information corresponding to the code symbol may be stored in the radio tag 32.

[0021] FIG. 4 is an explanatory view of commodity-information reading according to the present embodiment. As shown in FIG. 4, first, the operator places a basket 42 for containing a registered commodity 41 in a downstream position of the commodity laying table 15 from the barcode reading section 19 with respect to the moving direction of the commodity 41.

[0022] When the customer places a basket 43 containing the commodity 41 on the sensor section 22 of the commodity laying table 15, the sensor section 22 detects that the basket 43 has been placed, and the barcode reading section 19 and the radio tag reading section 21 are started.

[0023] After the barcode reading section 19 is started, the section reads the barcode 33 held in front to the barcode reading section 19. Since the commodity informa-

tion registering apparatus starts the barcode reading section 19 when the sensor section 22 detects the basket 43, unnecessary power consumption is suppressed.

[0024] After the radio tag reading section 21 is started, the section forms a reading field (first field) 44 of the radio tag 32 extending upwards from the commodity laying table 15 as shown by a two-dot chain line. The reading field 44 of the radio tag 32 is disposed in a locus of the commodity 41 at a time when the operator takes the commodity 41 out of the basket 43 and moves the commodity.

[0025] The radio tag reading section 21 is set in such a manner that the electromagnetic wave radiated from the antenna (not shown) of the radio tag reading section 21 is radiated intensely in an upward direction in order to form the reading field 44 in the upward direction from the commodity laying table 15.

[0026] In the commodity information registering apparatus, the radio tag reading section 21 is started, when the basket 43 is detected. Therefore, the unnecessary power consumption is suppressed, and the radiation of the electromagnetic wave is also suppressed. This inhibits interference of the electromagnetic wave with another apparatus. Since the reading field 44 is formed in the upward direction from the commodity laying table 15, the only information of the commodity 41 moving above the commodity laying table 15 is read.

[0027] The operator takes the commodity 41 out of the basket 43, and moves the commodity 41 in an arrow direction. Moreover, while the commodity 41 is moved, the operator changes a direction of the commodity 41 in the reading field 44 of the radio tag 32 in such a manner that a dead-angle portion of the commodity 41 which is out of operator's field of vision comes in sight, and checks if the barcode 33 is attached to the commodity 41.

[0028] Moreover, when the operator finds the barcode 33, the operator changes the direction of the commodity 41 in such a manner that the barcode 33 turns to the barcode reading section 19, and further moves the commodity 41 to the barcode reading section 19.

[0029] When the radio tag 32 is attached to the commodity 41, the radio tag reading section 21 reads the commodity identification information from the radio tag 32 attached to the commodity 41 during these operations by the operator. When the barcode 33 only is attached to the commodity 41, the barcode reading section 19 reads the commodity identification information from the barcode 33 attached to the commodity 41.

[0030] When the commodity information corresponding to the read commodity identification information is registered, a reading sound is output. Therefore, after confirming the reading sound, the operator places the commodity in the basket 42.

[0031] Next, commodity-information registration performed by the commodity information registering apparatus will be described.

[0032] FIG. 5 is a flowchart showing the commodity-information registration according to the present embodiment. When the basket 43 is placed on the sensor section 22 of the commodity laying table 15, the basket 43 is detected by the sensor section 22, the barcode reading section 19 and the radio tag reading section 21 are started, and the registration shown in FIG. 5 is started.

[0033] It is first judged in ST11 whether or not the radio tag 32 has been read. If it is judged in ST11 that the radio tag 32 has not been read, it is judged in ST19 whether or not the barcode 33 has been read. If it is judged in ST19 that the barcode 33 has not been read, the judgment of ST11 is performed again. If it is judged that the radio tag 32 and the barcode 33 have not been read, the judgments of ST11 and ST19 are repeated.

[0034] If it is judged in ST11 that the radio tag 32 has been read, it is judged in ST12 whether or not only one radio tag 32 has been read. Moreover, if it is judged in ST12 that a plurality of radio tags 32 have been read, a warning sound is output from the loudspeaker 20 in ST13 to inform the operator that a plurality of radio tags 32 have been read. Moreover, after outputting the warning sound, the judgment of ST11 is performed again. Consequently, a plurality of radio tags 32 can be prevented from being simultaneously registered.

[0035] If only one radio tag 32 is read in ST12, the reading by the barcode reading section 19 and the radio tag reading section 21 is stopped in ST14. Accordingly, since one commodity 41 is prevented from being read a plurality of times, one commodity 41 is not registered as a plurality of commodities 41.

[0036] The barcode 33 is sometimes read from when the radio tag 32 is read until the reading stops in ST14. It is judged in ST15 whether or not the barcode 33 has been read. Moreover, if it is judged in ST15 that the barcode 33 has not been read, processing of ST25 is performed. Conversely, if it is judged in ST15 that the barcode 33 has been read, it is judged in ST16 whether or not the commodity information corresponding to the commodity identification information read from the radio tag 32 is the same as that corresponding to the commodity identification information read from the barcode 33.

[0037] If it is judged in ST16 that the commodity information from the radio tag 32 is different from that from the barcode 33, there is an error in the information of the barcode 33 or the radio tag 32 attached to the commodity 41, or two commodities 41 are read. In this case, an error sound is output from the loudspeaker 20 in ST17, and the operator is informed that the commodity information from the radio tag 32 is different from that from the barcode 33. If the processing of ST17 ends, the reading by the barcode reading section 19 and the radio tag reading section 21 is started in ST18, and the judgment of ST11 is performed again.

[0038] If it is judged in ST15 that the barcode 33 has not been read or if it is judged in ST16 that the commodity information from the radio tag 32 agrees with that from the barcode 33, the processing of ST25 is performed.

[0039] If the commodity information is registered in ST25, the reading sound is output from the loudspeaker 20 in ST26 to inform the operator that the commodity

registration has been performed. Thereafter, the reading by the barcode reading section 19 and the radio tag reading section 21 is started in ST27, and the judgment of ST11 is performed again. In this manner, it is possible to perform the commodity registration continuously.

[0040] If the radio tag 32 is not read in ST11 and if the barcode 33 is read in ST19, the reading by the barcode reading section 19 and the radio tag reading section 21 is stopped in ST20.

[0041] The radio tag 32 is sometimes read from when the barcode 33 is read until the reading stops in ST20. It is judged in ST21 whether or not the radio tag 32 has been read. Moreover, if it is judged in ST21 that the radio tag 32 has not been read, the processing of ST25 is performed. If it is judged in ST21 that the radio tag 32 has been read, it is judged in ST22 whether or not the commodity information corresponding to the commodity identification information read from the barcode 33 is the same as that corresponding to the commodity identification information read from the radio tag 32.

[0042] If it is judged in ST22 that the commodity information from the barcode 33 is different from that from the radio tag 32, there is an error in the information of the barcode 33 or the radio tag 32 attached to the commodity 41, or the commodity identification information of two commodities 41 are read. In this case, the error sound is output from the loudspeaker 20 in ST23, and the operator is informed that the commodity information from the barcode 33 is different from that from the radio tag. Moreover, after outputting the error sound, the reading by the barcode reading section 19 and the radio tag reading section 21 is started in ST24, and the judgment of ST11 is performed again.

[0043] If it is judged in ST21 that the radio tag 32 has not been read or if it is judged in ST22 that the commodity information from the barcode 33 agrees with that from the radio tag 32, the processing of ST25 is performed. Moreover, if the commodity information is registered in ST25, the reading sound is output from the loudspeaker 20 to inform the operator that the commodity registration has been performed in ST26. Furthermore, after outputting the reading sound, the reading by the barcode reading section 19 and the radio tag reading section 21 is started in ST27, and the judgment of ST11 is performed again.

[0044] Consequently, in a case where the commodity identification information of the commodity 41 provided with the barcode 33 and the radio tag 32 is read, even when both of the barcode 33 and the radio tag 32 are read, one commodity 41 is correctly registered as one commodity. The operator is securely informed that the commodity can be registered.

[0045] Thereafter, the next commodity is also registered in accordance with the flowchart of FIG. 5. Accordingly, even in a case where the commodity 41 provided with the barcode 33 and the radio tag 32, the commodity 41 provided with the barcode 33 only, and the commodity 41 provided with the radio tag 32 only exist in a mixed manner, when the operator moves the commodity 41 from the basket 43 containing the commodity 41 before registered to the basket 42 for containing the registered commodity 41, the barcode 33 or the radio tag 32 is read to register the commodity information.

[0046] Moreover, it is sometimes difficult to read the barcode 33 because of dirt on the barcode 33 portion or because a barcode 33 portion is not flat. Even in this case, when the barcode 33 and the radio tag 32 are attached to the commodity 41, the radio tag 32 is read by the radio tag reading section 21, and therefore an efficiency of the commodity registration is improved.

[0047] Furthermore, in the present embodiment, the reading field 44 of the radio tag 32 is disposed closer to the basket 43 containing the commodity 41 before registered, that is, closer to the sensor section 22 than the reading field of the barcode 33 is. Therefore, since the commodity information of the commodity 41 provided with the radio tag 32 is registered before directing the barcode 33 of the commodity 41 to the barcode reading section 19, the operation efficiency of the commodity registration is enhanced.

[0048] It is to be noted that the example in which the database section 24 is disposed inside the POS terminal 11 has been described above, but the present invention is not limited to this example. For example, the commodity identification information and the corresponding commodity information may be stored in a store server network-connected to the POS terminal 11. In this case, the POS terminal 11 sends to the store server an inquiry including the commodity identification information, and the store server returns the commodity information corresponding to the inquiry to the POS terminal 11.

[0049] Moreover, the sensor section 22 may be omitted. That is, the barcode reading section 19 and the radio tag reading section 21 may periodically read the reading field, and the operator may operate the terminal input section 14 or the scanner input section 18 to start the barcode reading section 19 and the radio tag reading section 21.

[0050] Furthermore, when the commodity identification information stored in the radio tag 32 agrees with that of the barcode 33, the commodity identification information of the radio tag 32 may be directly compared with that of the barcode 33 instead of the comparison of the commodity information from the radio tag 32 with that from the barcode 33 performed in ST16 and ST22 of FIG. 5.

[0051] Next, a modification of the commodity information registering apparatus will be described. FIG. 6 is an explanatory view of the commodity-information reading according to a modification of the embodiment. As shown in FIG. 6, the commodity information registering apparatus of the present modification is provided with shielding plates 51, 52. The shielding plate 51 is disposed in the vicinity of a basket 43 containing a commodity 41 before registered, and the shielding plate 52 is disposed in the vicinity of a basket 42 for containing the registered com-

modity.

[0052] These shielding plates 51, 52 do not complete interrupt an electromagnetic wave, and may decay the electromagnetic wave radiated from the radio tag reading section 21 to such an electric power that a radio tag 32 in the basket 43 is not started. Therefore, there is not any restriction as to materials of the shielding plates 51, 52 as long as the materials are conductive or decay a frequency for use in communication of the radio tag 32.

[0053] Accordingly, since a radio tag reading section 21 does not read information of the commodity 41 in the basket 43, erroneous registrations are reduced. It is to be noted that even when the materials of the baskets 42, 43 are similar to those of the shielding plates 51, 52, that is, the materials which decay the electromagnetic waves, similar effects are obtained.

(Second Embodiment)

[0054] A second embodiment will be described with reference to FIG. 7. It is to be noted that in the following description, descriptions of a constitution and a function similar to those of the first embodiment are omitted.

[0055] In the first embodiment, the radio tag reading section 21 is disposed beside the barcode reading section 19 of the stationary scanner 16. On the other hand, in the present embodiment, a radio tag reading section 21 is disposed on one surface of a main body of a stationary scanner 16 on which a barcode reading section 19 is disposed. In the present embodiment, the radio tag reading section 21 is disposed in an upstream position from the barcode reading section 19 of the stationary scanner 16 with respect to a moving direction of a commodity.

[0056] First, an operator places a basket 42 for containing the registered commodity on a commodity laying table 15. When a customer places a basket 43 containing a commodity 41 to purchase on a sensor section 22 of the commodity laying table 15, the sensor section 22 detects that the basket 43 has been placed, and the barcode reading section 19 and the radio tag reading section 21 are started. After the radio tag reading section 21 is started, the section forms a reading field 44 of a radio tag 32 in a direction crossing the commodity laying table 15 as shown by a two-dot chain line. The reading field 44 of the radio tag 32 has a height equal to that of the barcode reading section 19.

[0057] While moving the commodity 41 to the barcode reading section 19, the operator changes a direction of the commodity 41 in such a manner that a barcode 33 attached to the commodity 41 turns to the barcode reading section 19. Even when the barcode 33 is not attached to the commodity 41, the operator changes the direction of the commodity 41 appropriately, while moving the commodity 41 to the barcode reading section 19.

[0058] The reading field 44 of the radio tag 32 is in a locus of the commodity 41 at a time when the operator moves the commodity 41 to the barcode reading section 19. Therefore, when the radio tag 32 is attached to the commodity 41, the radio tag reading section 21 reads commodity identification information from the radio tag 32 attached to the commodity 41 during these operations of the operator. In a case where the barcode 33 only is attached to the commodity 41, the barcode reading section 19 reads the commodity identification information from the barcode 33 attached to the commodity 41.

[0059] In a case where the radio tag reading section 21 is disposed in the commodity laying table 15, a height of the reading field 44 of the radio tag reading section 21 exceeds that of the barcode reading section 19.

[0060] On the other hand, in the present embodiment, since the radio tag reading section 21 is disposed next to the barcode reading section 19, the height of the reading field 44 of the radio tag 32 is approximately equal to that of the barcode reading section 19, and the field is formed in the direction crossing the commodity laying table 15.

[0061] Therefore, the reading field 44 of the radio tag reading section 21 is smaller than that of the first embodiment. Consequently, as to the radio tag reading section 21 in the present embodiment, a portion for radiating an electromagnetic wave is miniaturized as compared with the radio tag reading section 21 in the first embodiment.

[0062] Moreover, in the commodity information registering apparatus of the present embodiment constituted as described above, even in a case where the commodity 41 provided with the barcode 33 and the radio tag 32, the commodity 41 provided with the barcode 33 only, and the commodity 41 provided with the radio tag 32 only exist in a mixed manner, while the operator is moving the commodity 41 from the basket 43 containing the commodity 41 before registered to the basket 42 for containing the registered commodity 41, the barcode 33 or the radio tag 32 is read to register the commodity information.

[0063] Furthermore, in the present embodiment, the reading field 44 of the radio tag 32 is disposed closer to the basket 43 containing the commodity 41 before registered, that is, closer to the sensor section 22 than the reading field of the barcode 33 is.

[0064] Therefore, when the radio tag 32 is attached to the commodity 41, the commodity information is registered before directing the barcode 33 to the barcode reading section 19, and therefore an operation efficiency of commodity registration is enhanced.

(Third Embodiment)

[0065] Next, a third embodiment will be described with reference to FIGS. 8 to 11. It is to be noted that in the following description, description of the same constitution and function as those of the first and second embodiments is omitted.

[0066] In the first and second embodiments, the reading field 44 of the radio tag 32 is disposed closer to the basket 43 containing the commodity before registered, that is, closer to the sensor section 22 than the reading

field of the barcode 33 is.

[0067] On the other hand, in the present embodiment, as shown in FIG. 8, a reading field 44 of a radio tag reading section 21 is disposed in such a manner as to include all of the reading field of a barcode reading section 19. Therefore, the radio tag reading section 21 of the present embodiment is disposed in a position different from that of the radio tag reading section 21 of the first embodiment.

[0068] FIG. 9 is a block diagram of the barcode reading section 19 according to the present embodiment. As shown in FIG. 9, a light source 62 outputs light for use in reading a barcode 33. A scanning section 63 emits the light output from the light source 62 as scanning light to the outside of the barcode reading section 19. A light receiving section 64 receives the light which has been emitted from the scanning section 63 to the outside of the barcode reading section 19, reflected by an object, and returned. Moreover, the section converts a received light signal into an analog electric signal. A decoder section 65 converts the analog electric signal converted by the light receiving section 64 into a digital electric signal, and outputs information of the barcode 33 as the digital electric signal. A commodity detecting section 66 judges presence of the object from the analog electric signal converted by the light receiving section 64, and outputs a judgment result as a digital signal.

[0069] A barcode reading control section 61 is connected to the light source 62, the scanning section 63, the decoder section 65, and the commodity detecting section 66, and controls the barcode reading section 19. The barcode reading control section 61 is connected to a control section 23 of the commodity information registering apparatus, and is controlled by the control section 23.

[0070] FIG. 10 shows one example of the analog electric signal appearing on an analog signal line 67. It is to be noted that in FIG. 10, the vertical axis indicates a time, and the horizontal axis indicates a voltage.

[0071] When there is not any commodity 41 in the reading field of the barcode reading section 19, the voltage of the analog signal line 67 is low as in a segment A of FIG. 10, and this is a noise level. When the commodity 41 comes in the reading field of the barcode reading section 19, the voltage of the analog signal line 67 becomes higher than the noise level as in a segment B of FIG. 10. This voltage depends on a reflectance of the commodity 41. When the barcode 33 attached to the commodity 41 comes in the reading field, the voltage of the analog signal line 67 has a waveform in accordance with widths of white and black bars of the barcode 33 as in a segment C of FIG. 10.

[0072] The commodity detecting section 66 outputs a signal indicating an L level, when the voltage of the analog signal line 67 is lower than a threshold value T. The section outputs a signal indicating an H level, when the voltage is higher than the threshold value T. When the barcode reading control section 61 detects that the signal from the commodity detecting section 66 changes from the L level to the H level, the section notifies the control section 23 that the commodity 41 has entered the reading field of the barcode 33. On receiving the notice that the commodity 41 has entered the reading field of the barcode 33, the control section 23 allows the radio tag reading section 21 to start the radiating of the electromagnetic wave.

[0073] Consequently, the commodity can be detected utilizing a function of reading the barcode 33. Only when the commodity 41 comes close to the reading field 44 of the radio tag 32, the electromagnetic wave for reading the radio tag 32 is output. Therefore, unnecessary power consumption is suppressed, and interference with another apparatus is also suppressed.

[0074] Moreover, the decoder section 65 digitizes and outputs the voltage in the segment C of FIG. 10. On receiving the digital signal from the decoder section 65, the barcode reading control section 61 transmits the digital signal to the control section 23.

[0075] First, an operator places a basket 42 for containing a registered commodity on a commodity laying table 15. When a customer places the basket 43 containing the commodity 41 to purchase on the sensor section 22 of the commodity laying table 15, the sensor section 22 detects that the basket 43 has been placed, and the barcode reading section 19 is started. At this time, the radio tag reading section 21 has not output any electromagnetic wave yet.

[0076] The operator takes the commodity 41 from the basket 43, and moves the commodity 41 in an arrow direction. In a case where the barcode 33 is attached to the commodity 41, the operator changes a direction of the commodity 41 in such a manner that the barcode 33 turns to the barcode reading section 19, while moving the commodity 41 to the barcode reading section 19.

[0077] Moreover, when the barcode 33 is not attached to the commodity 41, the operator changes the direction of the commodity 41 appropriately, while moving the commodity 41 to the barcode reading section 19. When it is detected that the commodity 41 has entered the reading field of the barcode reading section 19, the radio tag reading section 21 radiates the electromagnetic wave, and the reading field 44 appears.

[0078] When the radio tag 32 of the commodity 41 enters the reading field 44, the radio tag reading section 21 reads the commodity identification information from the radio tag 32 of the commodity 41. When the barcode 33 of the commodity 41 moves to the reading field of the barcode reading section 19, the barcode reading section 19 reads the commodity identification information from the barcode 33.

[0079] Next, commodity-information registration performed by the commodity information registering apparatus will be described. FIG. 11 is a flowchart showing the commodity-information registration according to the present embodiment. If the basket 43 is placed on the sensor section 22 of the commodity laying table 15, the

basket 43 is detected by the sensor section 22, the barcode reading section 19 is started, and the registration shown in FIG. 11 is started.

[0080] It is judged in ST41 whether or not the barcode reading section 19 has detected the commodity 41. If the commodity 41 is not detected, the judgment of ST41 is repeated. If the commodity 41 is detected in ST41, an electromagnetic wave is radiated from the radio tag reading section 21 in ST42. Thus, the radio tag 32 can be read.

[0081] If the electromagnetic wave is radiated from the radio tag reading section 21, it is judged in ST43 whether or not the radio tag 32 has been read. Moreover, if it is judged in ST43 that the radio tag 32 has not been read, it is judged in ST49 whether or not the barcode 33 has been read. If it is judged in ST49 that the barcode 33 has not been read, the judgment of ST43 is performed again. If the radio tag 32 and the barcode 33 are not read, the judgments of ST43 and ST49 are repeated.

[0082] If it is judged in ST43 that the radio tag 32 has been read, it is judged in ST44 whether or not only one radio tag 32 has been read. Moreover, if it is judged in ST44 that a plurality of radio tags 32 have been read, a warning sound is output from the loudspeaker 20 in ST47 to inform the operator that the plurality of radio tags 32 have been read.

[0083] Moreover, after outputting the warning sound, the reading by the radio tag reading section 21 is stopped in ST48, and commodity detection of ST41 is performed again. Consequently, a plurality of radio tags 32 can be prevented from being simultaneously registered.

[0084] If it is judged in ST44 that only one radio tag 32 is read, the reading by the barcode reading section 19 and the radio tag reading section 21 is stopped in ST45. Accordingly, since one commodity 41 is prevented from being read a plurality of times, one commodity 41 is not registered as a plurality of commodities 41.

[0085] The barcode 33 is sometimes read from when the radio tag 32 is read until the reading stops in ST45. It is judged in ST46 whether or not the barcode 33 has been read. Moreover, if it is judged in ST46 that the barcode 33 has not been read, processing of ST55 is performed. Conversely, if it is judged in ST46 that the barcode 33 has been read, it is judged in ST52 whether or not the commodity information corresponding to the commodity identification information read from the radio tag 32 is the same as that corresponding to the commodity identification information read from the barcode 33.

[0086] If it is judged in ST52 that the commodity information from the radio tag 32 is different from that from the barcode 33, there is an error in the information of the barcode 33 or the radio tag 32 attached to the commodity 41, or two commodities 41 are read.

[0087] Therefore, in this case, an error sound is output from a loudspeaker 20 in ST53, and the operator is informed that there has been an error. Moreover, after ST53, the reading by the barcode reading section 19 is started in ST54, and the commodity detection of ST41 is performed again.

[0088] If it is judged in ST46 that the barcode 33 has not been read or if it is judged in ST52 that the commodity information from the radio tag 32 agrees with that from the barcode 33, the processing of ST55 is performed. Moreover, after the read commodity information is registered in ST55, a reading sound is output from the loudspeaker 20 in ST56 to inform the operator that the commodity registration has been performed. Thereafter, the reading by the barcode reading section 19 is started in ST57, and the commodity detection of ST41 is performed again. Consequently, it is possible to perform the commodity registration continuously.

[0089] If the radio tag 32 is not read in ST43 and if the barcode 33 is read in ST49, the reading by the barcode reading section 19 and that by the radio tag reading section 21 are stopped in ST50. Consequently, since one commodity 41 is prevented from being read a plurality of times, one commodity 41 is not registered as a plurality of commodities 41.

[0090] The radio tag 32 is sometimes read from when the barcode 33 is read until the reading stops in ST50. It is judged in ST51 whether or not the radio tag 32 has been read. Moreover, if it is judged in ST51 that the radio tag 32 has not been read, the processing of and after ST55 is performed. Conversely, if it is judged in ST51 that the radio tag 32 has been read, the processing of and after ST52 is performed. Moreover, if the reading by the barcode reading section 19 is started in ST57, the commodity registration can be performed again.

[0091] Consequently, in a case where the commodity identification information of the commodity 41 provided with the barcode 33 and the radio tag 32 is read, even when both of the barcode 33 and the radio tag 32 are read, one commodity 41 is correctly registered as one commodity. The operator is securely informed that the commodity can be registered.

[0092] Thereafter, the next commodity is also registered in accordance with the flowchart of FIG. 11. Accordingly, even in a case where the commodity 41 provided with the barcode 33 and the radio tag 32, the commodity 41 provided with the barcode 33 only, and the commodity 41 provided with the radio tag 32 only exist in a mixed manner, when the operator moves the commodity 41 from the basket 43 containing the commodity 41 before registered to the basket 42 for containing the registered commodity 41, the barcode 33 or the radio tag 32 is read to register the commodity information.

[0093] Moreover, it is sometimes difficult to read the barcode because of dirt on the barcode 33 portion or because a barcode 33 portion is not flat. Even in this case, when the barcode 33 and the radio tag 32 are attached to the commodity 41, the radio tag 32 is read by the radio tag reading section 21, and therefore an efficiency of the commodity registration is improved.

[0094] Moreover, in the present embodiment, since the reading field 44 of the radio tag 32 is disposed in the vicinity of the barcode reading section 19, the operator can visually recognize the reading field 44. As a result,

an efficiency of a registering operation is improved.

(Fourth Embodiment)

[0095] Next, a fourth embodiment will be described with reference to FIG. 12. It is to be noted that in the following description, descriptions of a constitution and a function similar to those of the first to third embodiments are omitted.

[0096] The reading field 44 of the radio tag 32 in the third embodiment is disposed in such a manner as to include all of the reading field of the barcode 33. On the other hand, in the present embodiment, a reading field 44 of a radio tag 32 is disposed in a position closer to a basket 42 for containing a registered commodity 41 than a reading field of a barcode 33 is. That is, the reading field 44 is disposed in a position on a side opposite to a sensor section 22.

[0097] FIG. 12 is an explanatory view of commodity-information reading according to the fourth embodiment of the present invention. As shown in FIG. 12, in the same manner as in the third embodiment, a barcode reading section 19 can detect that the commodity 41 has entered the reading field, and a radio tag reading section 21 is started after the commodity detection.

[0098] First, an operator places the basket 42 for containing the registered commodity 41 on a commodity laying table 15. When a customer places a basket 43 containing the commodity 41 to purchase on the sensor section 22 of the commodity laying table 15, the sensor section 22 detects that the basket has been placed, and the barcode reading section 19 is started. At this time, the radio tag reading section 21 has not output any electromagnetic wave yet.

[0099] The operator takes the commodity 41 out of the basket 43, and moves the commodity 41 in an arrow direction. In a case where the barcode 33 is attached to the commodity 41, the operator moves the commodity 41 to the barcode reading section 19, while moving the commodity 41, and changing a direction of the commodity 41 in such a manner that the barcode 33 attached to the commodity 41 turns to the barcode reading section 19. Even when the barcode 33 is not attached to the commodity 41, the operator changes the direction of the commodity 41 appropriately, while moving the commodity 41 to the barcode reading section 19.

[0100] When it is detected that the commodity 41 has entered the reading field of the barcode reading section 19, the radio tag reading section 21 radiates an electromagnetic wave, and the reading field 44 of the radio tag 32 appears. Consequently, only when the commodity 41 comes close to the reading field 44 of the radio tag 32, the electromagnetic wave for reading the radio tag 32 is output. Therefore, unnecessary power consumption is suppressed, and interference with another apparatus is also suppressed.

[0101] When the barcode 33 is attached to the commodity 41, the barcode 33 of the commodity 41 is read by the barcode reading section 19. Even in a case where the barcode reading section 19 cannot read the barcode 33 of the commodity 41, when the radio tag 32 is attached to the commodity 41, and the radio tag 32 attached to the commodity 41 enters the radio tag reading field 44, the radio tag 32 of the commodity 41 is read by the radio tag reading section 21.

[0102] A procedure for reading commodity identification information and registering commodity information is the same as that of FIG. 11 described in the third embodiment, and a similar effect is obtained. Consequently, even in a case where the commodity 41 provided with the barcode 33 and the radio tag 32, the commodity 41 provided with the barcode 33 only, and the commodity 41 provided with the radio tag 32 only exist in a mixed manner, when the operator moves the commodity 41 from the basket 43 containing the commodity 41 before registered to the basket 42 for containing the registered commodity 41, the barcode 33 or the radio tag 32 is read to register the commodity information.

[0103] Moreover, it is sometimes difficult to read the barcode 33 because of dirt on the barcode 33 portion or because a barcode 33 portion is not flat. Even in this case, when the barcode 33 and the radio tag 32 are attached to the commodity 41, the radio tag 32 is read by the radio tag reading section 21, and therefore an efficiency of the commodity registration is improved.

[0104] Especially, in a store in which there are many commodities 41 provided with the barcodes 33, and there are less commodities 41 provided with the radio tags 32, the operator allows the barcodes 33 to be read in many cases. Therefore, by use of the present embodiment, a reading operation is rapidly enhanced.

(Fifth Embodiment)

[0105] Next, a fifth embodiment will be described with reference to FIG. 13. It is to be noted that in the following description, descriptions of the same constitution and function as those of the first to fourth embodiments are omitted.

[0106] In the first to fourth embodiments, the radio tag reading section 21 is fixed. On the other hand, in the present embodiment, a radio tag reading section 21 is movable with respect to a barcode reading section 19.

[0107] FIG. 13 is an explanatory view of commodity-information reading according to the fifth embodiment of the present invention. As shown in FIG. 13, in the present embodiment, the radio tag reading section 21 is movable with respect to the barcode reading section 19 as described above. Therefore, a reading field 44 of the radio tag reading section 21 and a reading field of the barcode reading section 19 are relatively movable disposed. That is, the radio tag reading section 21 is constituted to be movable in a direction approaching a basket 43 for containing a commodity 41 before registered or a basket 42 for containing the commodity 41 after registered.

[0108] Specifically, a screw 72 which fixes the radio

tag reading section 21 is disposed under a commodity laying table 15. A fixed portion 71 is fixed to the commodity laying table 15. When the screw 72 is loosened, the screw 72 is movable together with the radio tag reading section 21 in a direction of an arrow S in the figure. When the radio tag reading section 21 is moved to an appropriate position, and the screw 72 is tightened there, the radio tag reading section 21 and the screw 72 is fixed to the fixed portion 71.

[0109] For example, in a store in which there are many commodities 41 provided with barcodes 33, and there are less commodities 41 provided with radio tags 32, the radio tag reading section 21 is fixed in such a manner as to be positioned in the same manner as in the fourth embodiment. In a store in which the commodities 41 provided with the radio tags 32 substantially occupy a half of all the commodities, the radio tag reading section 21 is fixed in such a manner as to be positioned in the same manner as in the third embodiment. In a store in which there are many commodities 41 provided with radio tags 32, the radio tag reading section 21 is fixed in such a manner as to be positioned in the same manner as in the first embodiment. In a store in which the number of the commodities provided with the radio tags 32 gradually increases, the radio tag reading section 21 is first positioned in the same manner as in the fourth embodiment. When the commodities 41 provided with the radio tags 32 increase, the radio tag reading section may be moved in the same manner as in the first embodiment.

[0110] Moreover, a procedure of commodity-information registration may be the same as.that described in the first embodiment, but the procedure may be switched to that described in the third embodiment depending on a position where the radio tag reading section 21 is fixed. Consequently, since the position of the radio tag reading section 21 is optimized in accordance with a saturation ratio of the radio tags 32 in the store, an operation efficiency of commodity registration by an operator is improved.

[0111] The present invention is not limited to the above-described embodiments as such, and can be embodied by modification of constituting elements within a range that does not depart from the scope in an implementing stage. An appropriate combination of a plurality of constituting elements described in the above-described embodiments can form various inventions. For example, several constituting elements may be omitted from all the constituting elements described in the embodiments. Furthermore, the constituting elements of different embodiments may be appropriately combined.

[0112] It is explicitly stated that all features disclosed in the description and/or the claims are intended to be disclosed separately and independently from each other for the purpose of original disclosure as well as for the purpose of restricting the claimed invention independent of the composition of the features in the embodiments and/or the claims. It is explicitly stated that all value ranges or indications of groups of entities disclose every possible intermediate value or intermediate entity for the purpose of original disclosure as well as for the purpose of restricting the claimed invention, in particular as limits of value ranges.

Claims

1. A commodity information registering apparatus which registers commodity information while a commodity (41) is moved, **characterized by** comprising:

a radio tag reading section (21) which reads a radio tag (32) within a first field (44) to acquire commodity identification information stored in the radio tag (32);
an optical reading section (19) which reads a code symbol (33) within a second field to acquire commodity identification information described in the code symbol (33); and
a registering section (25) which registers one of the commodity information corresponding to the commodity identification information acquired from the radio tag (32) and the commodity information corresponding to the commodity identification information acquired from the code symbol (33).

2. The commodity information registering apparatus according to claim 1, **characterized in that** at least a part of the first field (44) is superimposed on that of the second field.

3. The commodity information registering apparatus according to claim 2, **characterized in that** the first field (44) is disposed upstream in a moving direction of the commodity (41) with respect to the second field.

4. The commodity information registering apparatus according to claim 2, **characterized in that** the first field (44) is disposed upstream in a moving direction of the commodity (41) with respect to the second field and at a height which is substantially equal to that of the second field.

5. The commodity information registering apparatus according to claim 2, **characterized in that** the first field (44) is disposed in such a manner as to include all of the second field.

6. The commodity information registering apparatus according to claim 2, **characterized in that** the first field (44) is disposed downstream in a moving direction of the commodity (41) with respect to the second field.

7. The commodity information registering apparatus

according to claim 2, **characterized in that** the first field (44) is relatively movably disposed with respect to the second field.

8. The commodity information registering apparatus according to claim 2, **characterized in that** the radio tag reading section (21) is disposed on a commodity laying table (15) on which the commodity (41) to be registered is laid, and
the first field (44) extends substantially vertically upwards from the commodity laying table (15).

9. The commodity information registering apparatus according to claim 2, **characterized in that** the radio tag reading section (21) and the optical reading section (19) are stopped, when the radio tag reading section (21) reads the radio tag (32).

10. The commodity information registering apparatus according to claim 2, **characterized in that** the radio tag reading section (21) and the optical reading section (19) are stopped, when the optical reading section (19) reads the code symbol (33).

Amended claims in accordance with Rule 86(2) EPC.

1. A commodity information registering apparatus which registers commodity information while a commodity (41) is moved, comprising:

a radio tag reading section (21) which reads a radio tag (32) within a first field (44) to acquire commodity identification information stored in the radio tag (32);
an optical reading section (19) which reads a code symbol (33) within a second field to acquire commodity identification information described in the code symbol (33);
a registering section (25) which registers one of the commodity information corresponding to the commodity identification information acquired from the radio tag (32) and the commodity information corresponding to the commodity identification information acquired from the code symbol (33); and
a loudspeaker (20) which outputs a warning indicating that a plurality of radio tags (32) have been read, when the radio tag reading section (21) simultaneously reads the plurality of radio tags (32),
wherein at least a part of the first field (44) is superimposed on that of the second field.

2. The commodity information registering apparatus according to claim 1, wherein a reading operation of the radio tag reading section (21) is stopped when the radio tag reading section (21) reads only one radio tag (32).

3. The commodity information registering apparatus according to claim 1, wherein the first field (44) is disposed upstream in a moving direction of the commodity (41) with respect to the second field.

4. The commodity information registering apparatus according to claim 1, wherein the first field (44) is disposed upstream in a moving direction of the commodity (41) with respect to the second field and at a height which is substantially equal to that of the second field.

5. The commodity information registering apparatus according to claim 1, wherein the first field (44) is disposed in such a manner as to include all of the second field.

6. The commodity information registering apparatus according to claim 1, wherein the radio tag reading section (21) is disposed on a commodity laying table (15) on which the commodity (41) to be registered is laid, and

the first field (44) extends substantially vertically upwards form the commodity laying table (15).

7. The commodity information registering apparatus according to claim 1, wherein the radio tag reading section (21) and the optical reading section (19) are stopped, when the optical reading section (19) reads the code symbol (33).

8. The commodity information registering apparatus according to claim 7, wherein the radio tag reading section (21) and the optical reading section (19) are restarted, when commodity registration by the registering section (25) is completed.

9. The commodity information registering apparatus according to claim 2, wherein the radio tag reading section (21) and the optical reading section (19) are restarted, when commodity registration by the registering section (25) is completed.

10. The commodity information registering apparatus according to claim 5, wherein the optical reading section (19) comprises a detecting section which detects that the commodity (41) has entered the second field, and

the radio tag reading section (21) is started, when the detecting section detects the commodity (41).

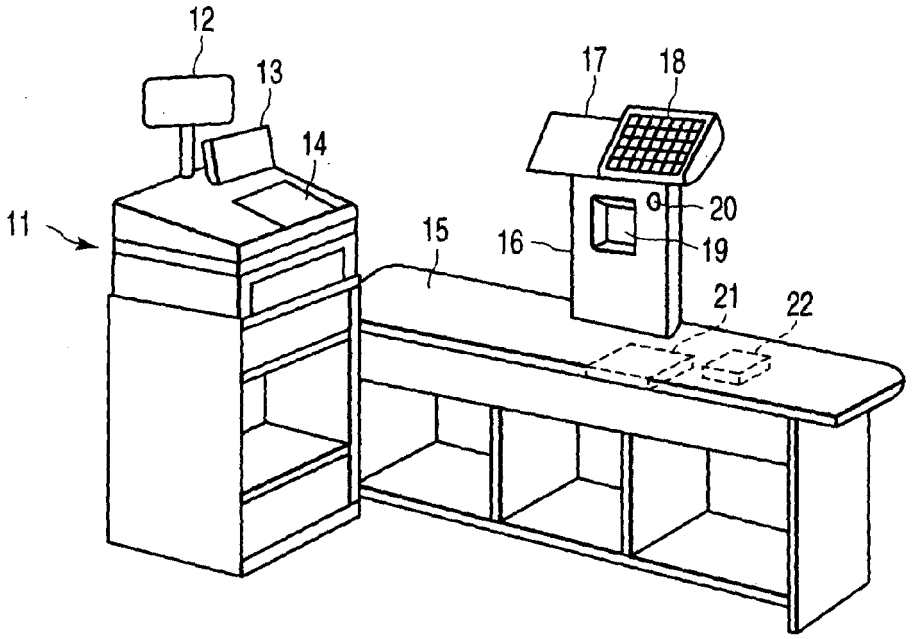

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FIG. 1

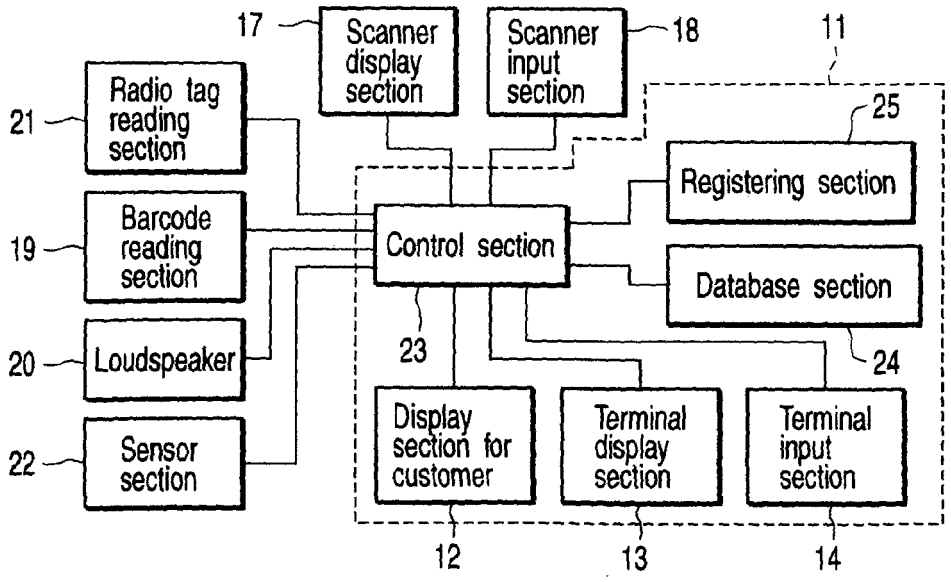

17
Scanner display section
Scanner input section
18
11
21
Radio tag reading section
25
Registering section
19
Barcode reading section
Control section
Database section
20
Loudspeaker
23
24
22
Sensor section
Display section for customer
Terminal display section
Terminal input section
12
13
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FIG. 2

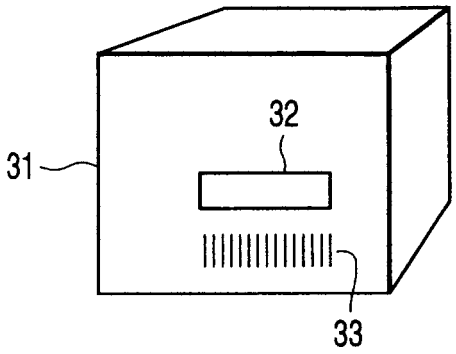


FIG. 3

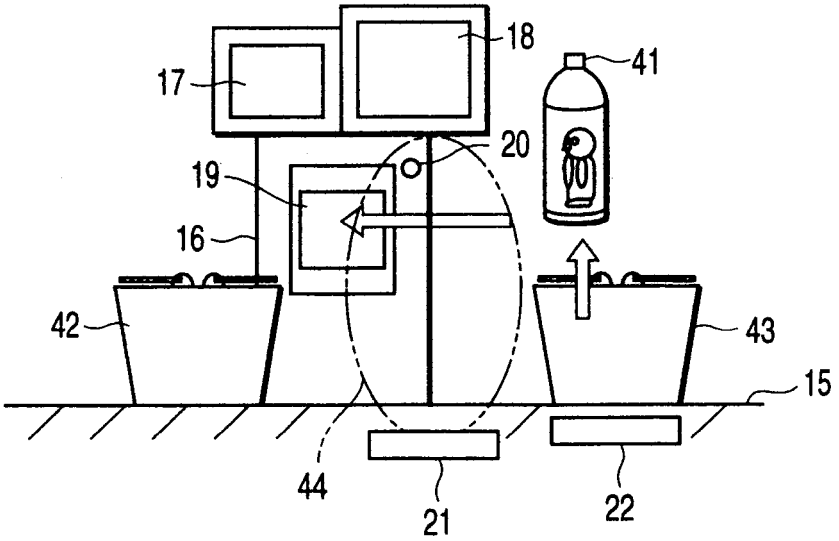


FIG. 4

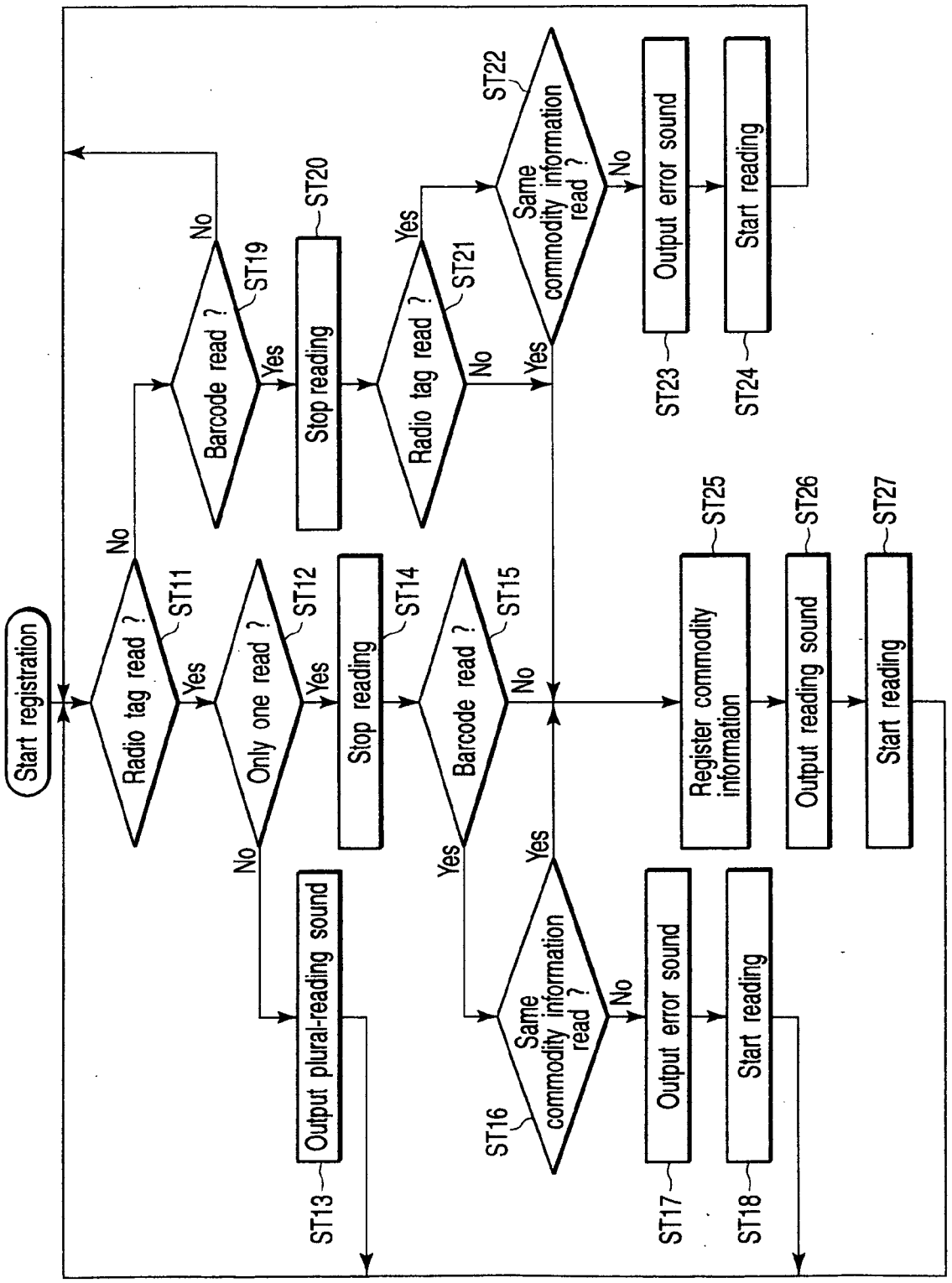

Start registration
Radio tag read ?
ST11
No
Yes
Only one read ?
ST12
No
Yes
Output plural-reading sound
ST13
Stop reading
ST14
Barcode read ?
ST15
Yes
No
Same commodity information read ?
ST16
No
Yes
Output error sound
ST17
Start reading
ST18
Register commodity information
ST25
Output reading sound
ST26
Start reading
ST27
Barcode read ?
ST19
No
Yes
Stop reading
ST20
Radio tag read ?
ST21
Yes
No
Same commodity information read ?
ST22
No
Yes
Output error sound
ST23
Start reading
ST24

FIG.5

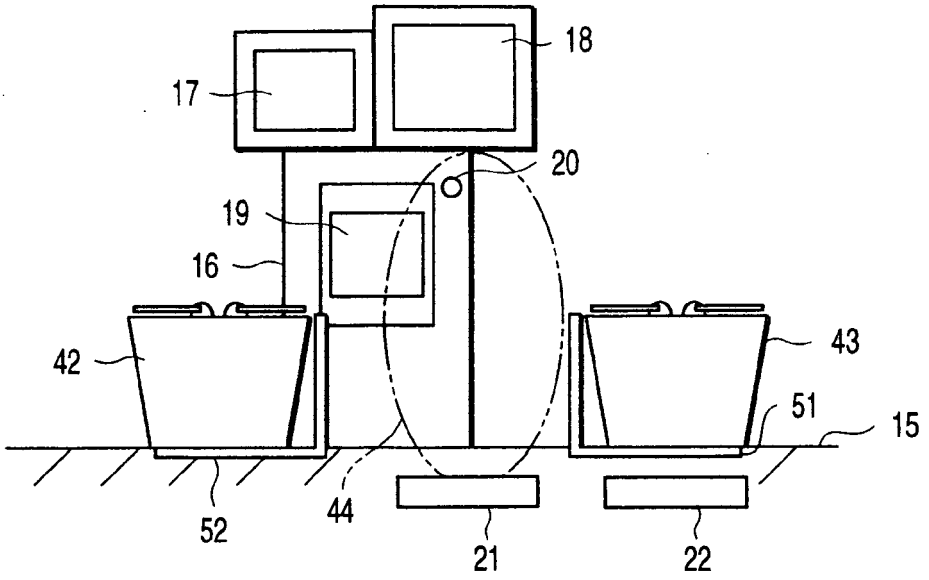

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FIG.6

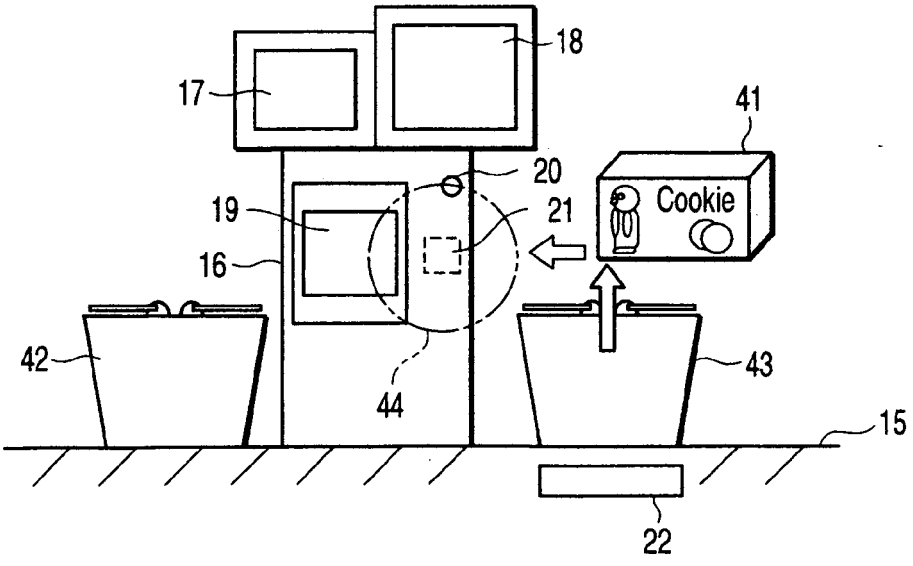

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17
41
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Cookie
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43
44
15
22

FIG.7

FIG. 8

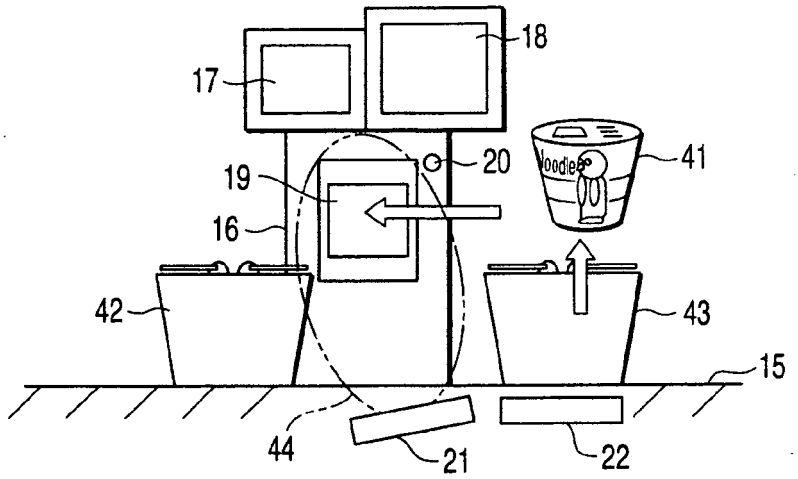


FIG. 9

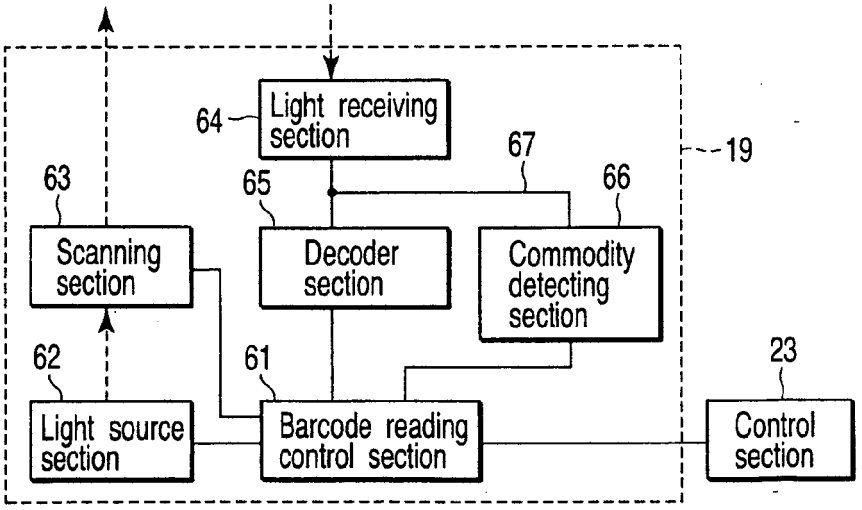
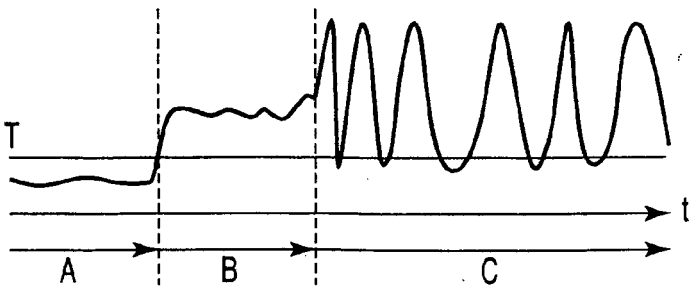


FIG. 10



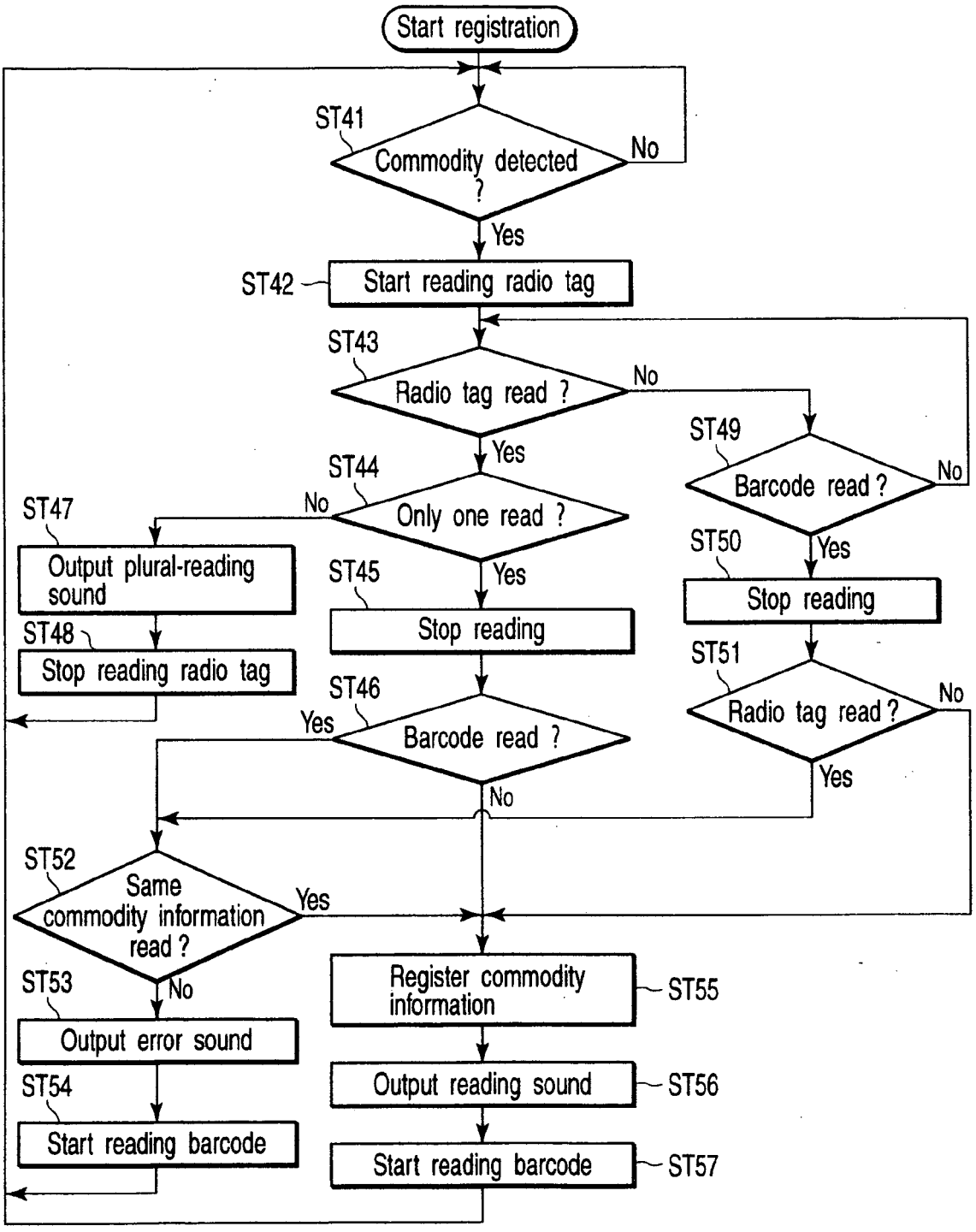

Start registration
ST41
Commodity detected ?
No
Yes
ST42
Start reading radio tag
ST43
Radio tag read ?
No
Yes
ST44
Only one read ?
No
Yes
ST45
Stop reading
ST46
Barcode read ?
Yes
No
ST47
Output plural-reading sound
ST48
Stop reading radio tag
ST49
Barcode read ?
No
Yes
ST50
Stop reading
ST51
Radio tag read ?
No
Yes
ST52
Same commodity information read ?
Yes
No
ST53
Output error sound
ST54
Start reading barcode
Register commodity information
ST55
Output reading sound
ST56
Start reading barcode
ST57

FIG. 11

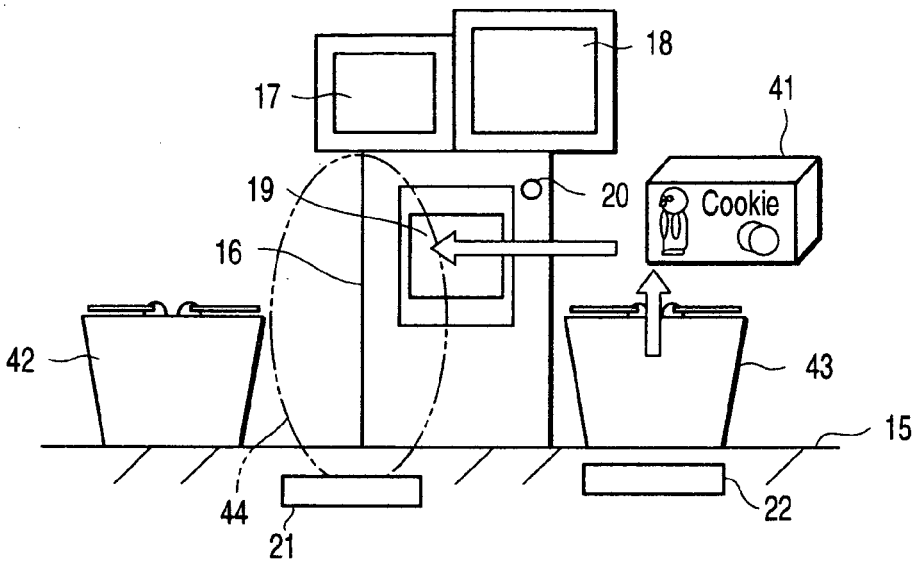

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FIG. 12

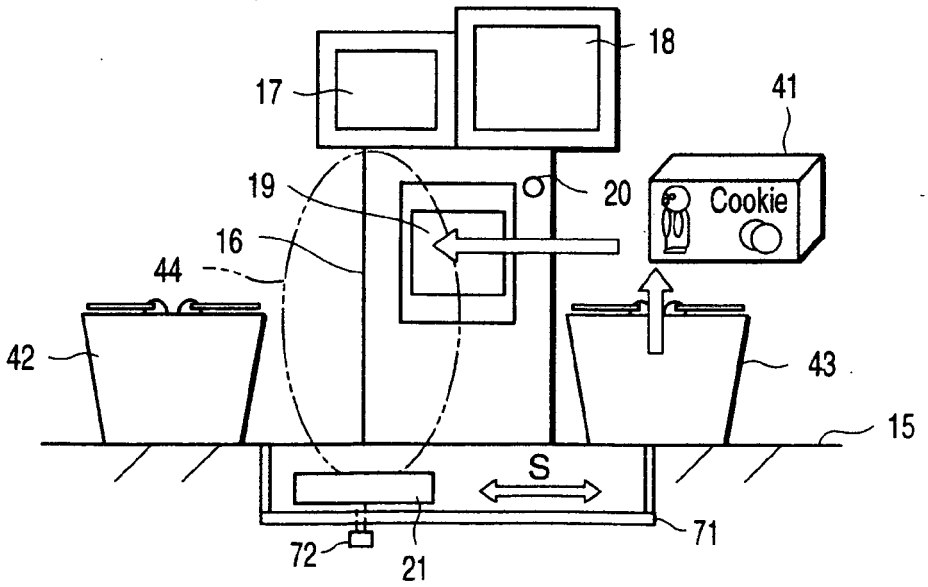

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Cookie
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FIG. 13

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 01 7092

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	WO 2004/109611 A (WINCOR NIXDORF INTERNATIONAL GMBH; HASSENBUERGER, ANNELIESE) 16 December 2004 (2004-12-16) * abstract * * page 4, line 13 - line 30 * * page 6, line 7 - page 7, line 7 * * page 8, line 27 - page 9, line 2 * * claims 1,3 * * figures 1-3 *	1-10	G07G1/00 A47F9/04
X	US 2002/145037 A1 (GOODWIN JOHN C) 10 October 2002 (2002-10-10) * abstract * * figure 1 * * paragraph [0004] - paragraph [0005] * * paragraph [0035] - paragraph [0051] * * claims 7-12 *	1-10	
A	US 5 382 784 A (EBERHARDT ET AL) 17 January 1995 (1995-01-17) * abstract * * figures 2,4 * * column 1, line 52 - column 2, line 10 *	1-10	TECHNICAL FIELDS SEARCHED (Int.Cl.7) A47F G07G
A	WO 00/10144 A (3M INNOVATIVE PROPERTIES COMPANY) 24 February 2000 (2000-02-24) * page 17, line 5 - page 18, line 4 * * figures 9,10 *	1-10	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	21 October 2005	Diepstraten, M

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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E : earlier patent document, but published on, or after the filing date
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 05 01 7092

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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21-10-2005

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2004109611 A	16-12-2004	DE 10323691 A1	23-12-2004
US 2002145037 A1	10-10-2002	EP 1251450 A1	23-10-2002
		JP 2003044797 A	14-02-2003
US 5382784 A	17-01-1995	AT 187269 T	15-12-1999
		AU 671007 B2	08-08-1996
		AU 6135194 A	29-08-1994
		CA 2154880 A1	18-08-1994
		DE 69421902 D1	05-01-2000
		DE 69421902 T2	20-07-2000
		EP 0682794 A1	22-11-1995
		JP 8506675 T	16-07-1996
		WO 9418642 A1	18-08-1994
WO 0010144 A	24-02-2000	AU 762475 B2	26-06-2003
		AU 5670599 A	06-03-2000
		BR 9913024 A	08-05-2001
		CA 2338601 A1	24-02-2000
		CN 1516054 A	28-07-2004
		CN 1312933 A	12-09-2001
		DE 1105855 T1	18-04-2002
		EP 1105855 A1	13-06-2001
		ES 2159502 T1	16-10-2001
		JP 2002522857 T	23-07-2002
		SG 107635 A1	29-12-2004
		SG 106668 A1	29-10-2004
		SG 106669 A1	29-10-2004
		US 6232870 B1	15-05-2001

EPO FORM P0459

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Patent documents cited in the description

- JP 11066435 A **[0002]**