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(54) Self-checkout apparatus and self-checkout method

(57) A self-checkout apparatus and method for processing items (5) represented by respective identity codes, which items (5) are selectable for purchase. The apparatus comprises a security tunnel (12) for passing through a shopping carrier (10) with selected items placed therein; a measuring device (13) at said security tunnel (12), for determining a collected characteristics value for the items (5) placed in the shopping carrier (10);

an identifier mechanism for determining the identity codes for the items (5) placed in the shopping carrier (10); and a self-service financial device (30, 50, 60) configured to retrieve stored characteristics values of said items (5) based on the determined identity codes, to compare the retrieved characteristics values with the collected characteristics value, and configured to accept purchase dependent on the comparison.

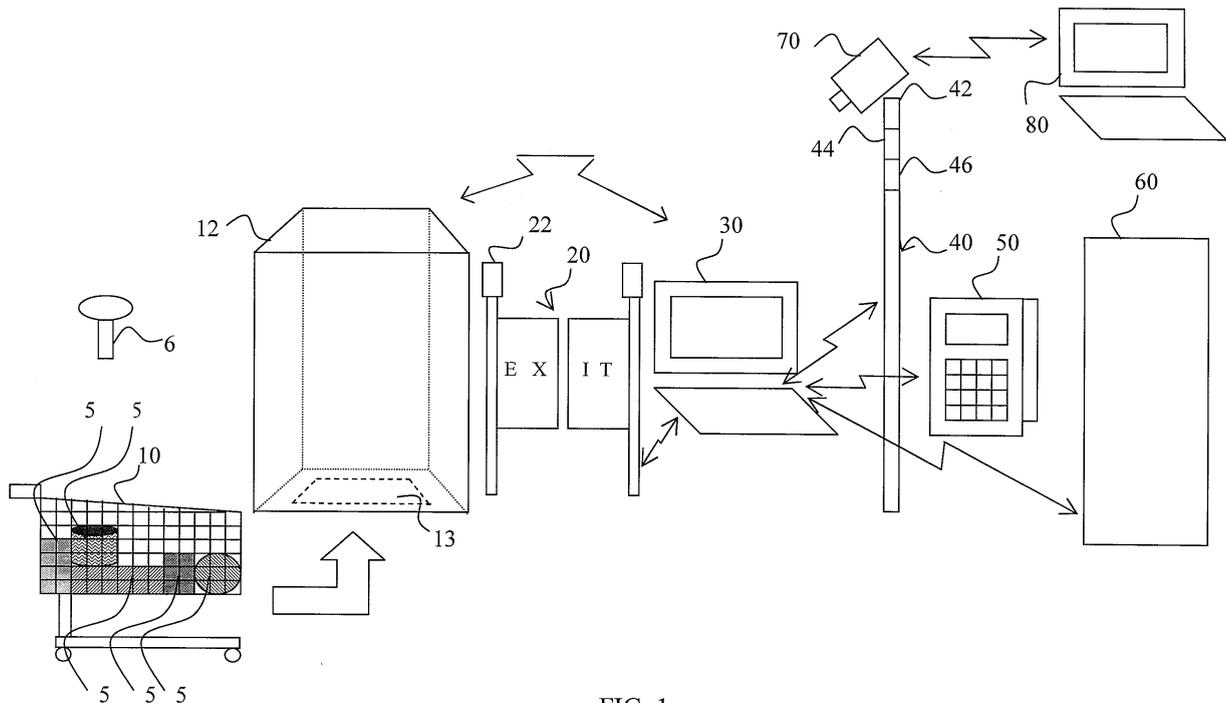


FIG. 1

Description

Technical field of invention

[0001] The present invention relates to a self-checkout apparatus and a self-checkout method for use in supermarkets or other retail establishments.

Background of invention

[0002] Today, different kinds of self-checkout systems are known on the market. There exist for example systems wherein a customer takes the items to a checkout counter where the Universal Product Code (UPC) of each item is scanned. After scanning, the items are carried by a conveyor to a bagging area. In this kind of systems, the cashier does not scan the UPC, instead the customer scans the UPC of each item. When the customer has completed the scanning a recall number is issued to the customer, which number the customer takes to a cashier for payment. A drawback with this kind of system is the need of a cashier to accomplish the payment. After the cost of the items sold, labour is the fastest growing expense. Therefore it would be desirable also to reduce the labour working in the retail establishment.

[0003] In another kind of self-checkout system, the customer takes a scanner upon entry into the supermarket and scans the products before putting them in the shopping trolley or basket. When the customer arrives at the checkout counter, the scanner is given to a cashier for reading the scanned items and for payment of the scanned items. A drawback with this kind of system is that the customer may scan the code of cheaper items instead of the code of the items that he/she put in the shopping trolley. In order to overcome this drawback, spot checks comparing the scanned items and the items in the trolley are made. Another drawback is the need of a cashier at each counter.

[0004] In the supermarket industry approximately 2-3 percent of the turnover is lost due to theft and shoplifting. This percentage value is quite large, especially when the value is compared to the profit, which typically is in the order of 1-2 percent of the turnover. Thus, there is also a demand for preventing shoplifting.

[0005] US patent 6,837,428 B2 discloses a self-checkout system including a first conveyor having a security tunnel which measure a characteristic of an item placed on the conveyor. A code identifying the item is first inputted into the system through UPC scanning or other input means and then the item is placed on the conveyor. When the characteristic of the item is measured, e.g. weight, height, width, length, it is compared to corresponding information within the system. If the data matches or is within a predetermined tolerance, the item is transported down the conveyor to a second conveyor, which further transports the item to a bagging area. When the customer has finished scanning, an input device allows the customer to select self-payment.

[0006] A drawback with the self-checkout system disclosed in the US patent 6,837,428 B2 is that the selected items are processed one by one and the customer has to manually scan each item at the counter before putting the item on the conveyor. Thus, the time spent at the counter is considerable high and can be compared with the time spent at the counter when a cashier scans each items. Therefore, the throughput of customers at the counter is not increased with such a self-checkout apparatus.

Summary of invention

[0007] The present invention relates to a self-checkout apparatus and a self-checkout method for use in supermarkets or other retail establishments. An object of the present invention is to overcome the abovementioned drawbacks and disadvantages with the prior art systems. Aspects of the object are to minimise the need of labour working in the retail establishment, increase the customer throughput at the counter, and prevent shoplifting.

[0008] The object and aspects of the object are fulfilled by a self-checkout apparatus for processing items represented by respective identity codes, which items are selectable for purchase. The apparatus comprises a security tunnel for passing through a shopping carrier with selected items placed therein; a measuring device at said security tunnel for determining a collected characteristics value for the items placed in the shopping carrier; an identifier mechanism for determining the identity codes for the items placed in the shopping carrier; and a self-service financial device configured to retrieve stored characteristics values of said items based on the determined identity codes, to compare the retrieved characteristics values with the collected characteristics value, and configured to accept purchase dependent on the comparison.

[0009] The invention also relates to a self-checkout method for processing items represented by respective identity codes, which items are selectable for purchase, said method comprising the steps of:

- collecting items in a shopping carrier;
- placing said shopping carrier in a security tunnel;
- determining a collected characteristics value for said items when placed in said shopping carrier using a measuring device;
- determining the identity codes for the items placed in the shopping carrier;
- retrieving stored characteristics values of said items based on the determined identity codes;
- comparing said retrieved characteristics values with said collected characteristics value; and
- accepting purchase dependent on the comparison.

[0010] An advantage with the present invention is that the selected items can be processed when placed in the shopping carrier. Thus, there is no need for the customer

to pick each item up at the counter in order to have it scanned. Instead the items can remain in the shopping carrier during the entire checkout procedure, whereby the customer throughput can be increased. Further, another advantage of the invention is that it provides a check of the items in the shopping carrier before accepting purchase by measuring characteristics of the shopping carrier with the items and comparing the measured characteristics with stored characteristics, whereby shoplifting can be reduced.

[0011] Preferred embodiments of the invention are set out in the dependent claims.

Brief description of drawings

[0012] The present invention will be described in more detail with reference to the accompanying drawings, in which:

FIG. 1 schematically illustrates an overview of an embodiment of the inventive a self-checkout apparatus together with a shopping trolley; and
FIG. 2 schematically illustrates in more detail an embodiment of a side view of a security tunnel.

Detailed description of invention

[0013] The present invention relates to a self-checkout apparatus and a self-checkout method for use in supermarkets or other retail establishments and will be described in more detail with reference to the drawings. In the drawings, the same reference numerals are used for the same or similar parts, components or features.

[0014] Figure 1 schematically illustrates a preferred embodiment of the inventive self-checkout apparatus for processing items 5 in a shopping trolley 10. Figure 1 illustrates schematically a front view of a security tunnel 12 comprised in the apparatus. Figure 2 schematically illustrates in more detail an embodiment of a security tunnel 12. In figure 2, a side view of the security tunnel is illustrated.

[0015] The shopping trolley used in this description is only intended to give an example of a suitable shopping carrier. The inventive self-checkout apparatus is not limited to uses with a shopping trolley but can be used for another kind of a shopping carrier, such as a shopping basket. The items 5 can be any kind of items for sale in a retail establishment and selected for purchase by a customer. Items, such as fruits or vegetables, having a price per kilograms are preferably grouped together, e.g. in a plastic bag, and weighed on a weighing means in the supermarket. After weighing, a price tag comprising information of the group of items is stuck to the plastic bag. The price tag can for example indicate the price, type and the weight of the selected group of items.

[0016] The self-checkout apparatus comprises a security tunnel 12 having measuring device 13 for determining a collected characteristics value of the selected

items 5. The self-checkout apparatus may further comprises a conveyor 14 configured to transport the shopping trolley 10 from a first position I to a second position II, at which second position II the measuring device 13 is configured to determine a collected characteristics value of the items 5. The first position I is preferably located outside the security tunnel 10 and the second position II within the security tunnel 10. However, as understood by those skilled in the art, the conveyor is not mandatory for the invention. The shopping trolley may for example be manually placed by the customer at the measuring device in order to determine the characteristics value.

[0017] In an embodiment, the measuring device 13 is a weighing device 13 configured to weigh the shopping trolley 10 with the items 5 located therein. The total weight of the items 5 can be determined by withdrawing the weight of the shopping trolley from the total weight determined by the weighing device 13. The weight of the shopping trolley is known in advance and is preferably pre-stored in a storing means. However, the weighing device can be calibrated with regard to the weight of the shopping trolley, whereby the weighing device indicates a negative value when no object is placed on the weighing device and a positive value corresponding to the total weight of the items when the shopping trolley with items is placed on the weighing device. The weighing device 13 can be configured to perform weighing up to several hundred kilograms with an accuracy of approximately 1 hectogram.

[0018] The shopping trolley is for example made of a light weight plastic material.

[0019] The self-checkout apparatus further comprises a self-service financial device 30, 50, 60 communicatively connected to the security tunnel 12 and the measuring device 13. The self-service financial device 30, 50, 60 is configured, by means of the identity the items 5, to retrieve stored characteristics values of the identified items 5 from a storing means (not shown), to compare the retrieved characteristics values with the determined collected characteristics value and configured to accept purchase if the retrieved characteristics values matches the determined collected characteristics value within a pre-determined tolerance.

[0020] In an embodiment, the self-service financial device 30, 50, 60 is arranged to communicate with a self-scanner 6 by means of which the customer scans each item or group of items while shopping, whereby information, such as the identity, of the item is determined. Preferably, the customer picks up the self-scanner 6 upon entry into the supermarket and scans the products before putting them in the shopping trolley. The self-scanner 6 is configured to, by means of e.g. laser, read a price tag or a bar code on the item 5, whereby the item 5 can be identified. The identity of the item 5 can further be stored in a memory of the self-scanner 6. When the customer arrives at the self-checkout apparatus, he connects the self-scanner 6 to the self service financial device 30, 50, 60 by means of a wired communication link or a wireless

communication link, e.g. Bluetooth. The self-service financial device 30, 50, 60 retrieves the identity of the scanned items from the self-scanner 6. By means of the identity information, the self-service financial device 30, 50, 60 can retrieve the pre-stored weight of each item from the storing means. The retrieved weights are added and compared with the measured total weight of the items, with due regard to the weight of the shopping trolley. In case of grouped items such as fruits or vegetables in a plastic bag, the self-scanner scans also the weight of the grouped items, which weight can be used together with the retrieved weight of other items in the shopping trolley in order to determine the total weight of the items.

[0021] In embodiments of the invention, a mobile phone or another handheld device having e.g. optical means for identifying the items to be purchased can be used instead of the self-scanner.

[0022] In an embodiment, the self-checkout apparatus comprises a RFID (Radio frequency IDentification) scanner 16. A RFID scanner uses wireless data collection technology to scan electronic tags used for storing data. The RFID scanner comprises an antenna configured to send signals and to receive signals from electronic tags. The tags can be scanned or read when they are within the proximity of a transmitted radio signal. The tags can be passive, i.e. without power source, or active, i.e. with a power source such as a battery.

[0023] The RFID scanner 16 can be arranged in the security tunnel 12 and configured to read a RFID tag on each of the items 5 in the shopping trolley 10 when the shopping trolley 10 is placed within the security tunnel 12. Thus, the items 5 in the shopping trolley 10 can be scanned and identified when the trolley 10 is within a predetermined distance from the RFID scanner 16, e.g. within the security tunnel 12.

[0024] In this embodiment, the self-scanner can be excluded or the RFID scanner can be used as a supplement to the self-scanner in order to verify the scanning made by the customer.

[0025] In embodiments of the invention comprising a conveyor 14, the conveyor 14 may comprise three parts; a first conveyor part 14a, a second conveyor part 14b and a third conveyor part 14c. The first and third conveyor parts 14a, 14c can for example be configured as an entrance ramp from a base level to a top level, and an exit ramp from the top level to the base level, respectively. The distance A between the base level and the top level is in the order of 7 - 8 centimetres. The second conveyor part 14b may be located at the top level between the first and third conveyor parts 14a, 14c. The self-checkout apparatus further comprises conveyor wheels 17 configured to move the conveyor 14.

[0026] In an embodiment, the conveyor 14 comprises a magnetic track 15 configured to lock at least one wheel 11 of the shopping trolley 10 by activating a magnetic locking means 11a of the wheel 11. The magnetic track 15 is arranged such that the wheel 11 is locked while the shopping trolley 10 is transported on said conveyor 14

from a first end 15a of the magnetic track 15 to a second end 15b of the magnetic track 15. The magnetic locking means 11a is made of a magnetic metal. Figure 2 only shows the magnetic track 15 at the second conveyor part 14b, however, it should be understood that the magnetic track 15 can extend from a position on the left side of the first conveyor part 14a to a position on the right side of the third conveyor part 14c in order to facilitate transportation over the ramp portions.

[0027] It should be understood that other means for fixing the shopping carrier at the conveyor can be provided. For example, the conveyor can be configured to lock the shopping carrier to the conveyor. The conveyor can be provided with at least one recess configured to receive a wheel of the shopping carrier and thereby fixing the shopping carrier to the conveyor. The conveyor can also be configured with recesses or protrusions configured to receive a protrusion or a recess arranged at the shopping trolley, whereby the shopping trolley is kept in place at the conveyor. Embodiments of the invention can also comprise a robot arm configured to lock the shopping carrier at the conveyor or to transport the shopping carrier.

[0028] Thus, by means of the locking device the shopping trolley can be fixed at the conveyor and transported by the conveyor to a desired position, e.g. position II in figure 2. The security tunnel can be provided with a control device (not shown) configured to determine, e.g. by means of an IR-detector, when the shopping trolley is in the desired position. When the detector detects the shopping trolley in the correct position, the rotation of the conveyor wheels is stopped in order to stop the movement of the conveyor. Further, a signal is sent to the measuring device in order to perform a measurement of the characteristics of the shopping trolley. After the measurement, the conveyor wheel starts to rotate, whereby the conveyor and consequently also the shopping trolley start to move. When the shopping trolley passes an unlock position, e.g. the end of the magnetic track, the lock is unlocked and the shopping trolley can be freely moved by the customer.

[0029] In embodiments of the invention, the control device is configured to start the conveyor again only if the retrieved characteristics match the measured characteristics within a predetermined tolerance.

[0030] Embodiments of the self-checkout apparatus further comprises an indicator 40 communicatively connected to the self-service financial device 30, 50, 60 and configured to generate a signal indicative of the comparison result, i.e. indicative of the result of the comparison between the retrieved characteristics and measured characteristics. The indicator 40 can be configured to generate a red light if the retrieved characteristics do not match the measured characteristics within a predetermined tolerance, to generate a green light if the retrieved characteristics match the measured characteristics within a predetermined tolerance, and/or to generate a yellow light if a supervisor is to make a spot check.

[0031] In an embodiment, the security tunnel 12 comprises deactivation means 18 for deactivating security tags arranged on the items 5. The deactivation means 18 for deactivating security tags is communicatively connected to the self-service financial device 30, 50, 60 and configured to deactivate the security tags if the retrieved characteristics match the measured characteristics within a predetermined tolerance, i.e. within a few percent, e.g. +/- 5 percent. The predetermined tolerance can be varied and be selected by the owner of the supermarket since the value of the predetermined tolerance will affect the sensitivity of the apparatus. Thus the demanded effort of the supermarket personnel may depend on the predetermined tolerance value.

[0032] In embodiments of the invention, the RFID scanner comprises deactivation means, whereby the RFID scanner is configured to deactivate security tags arranged on the items.

[0033] An embodiment of the security tunnel comprises optical means (not shown), such as a camera. The optical means is configured to detect the size, shape, colour and/or trade mark of the items and by means of the detected information identify the items. The optical means can be a complement to the RFID scanner or the optical means can replace the RFID scanner.

[0034] In an embodiment, the self-service financial device 30, 50, 60 is communicatively connected to a security gate 20 located at an exit end of a customer passage-way. The security gate 20 can for example be controlled by the self-service financial device 30, 50, 60 and configured to be opened in response to the customer making a correct payment for the total amount of items 5.

[0035] An embodiment further comprises an alarm device 22 arranged at the security gate 20. The alarm device 22 is configured to sound an alarm if an item 5 having an activated security tag is at a distance within the coverage of said security gate 20. In an embodiment, the alarm device is comprised in the RFID scanner.

[0036] In an embodiment, the self-service financial device 30, 50, 60 comprises an interactive terminal 30, a card reader 50 and a terminal for cash payment 60, which are communicatively connected to each other.

[0037] The interactive terminal 30 is communicatively connected to the security tunnel 12 and configured to guide a customer through a merchandise purchasing transaction. Thus the interactive terminal 30 is configured to provide instructions to the customer at various stages of the transaction. The instructions can be presented to the customer via a display means of the interactive terminal 30. The interactive terminal 30 can further be configured to receive instructions from the customer via an input interface, such as a keyboard, connected to the interactive terminal 30.

[0038] The card reader 50 can be configured to read data from a card such as a customer identification card, a debit card, a credit card or a smart card. A smart card is a plastic card with memory and microprocessor embedded in it so that it can be used for direct money transfer

or for identification of the user.

[0039] The terminal for cash payment 60 is configured to accept currency for payment and to dispense currency as change in response to a payment.

5 **[0040]** In an embodiment, the security tunnel 12 is made of an aluminium framework comprising several aluminium sections.

10 **[0041]** An embodiment of the invention further comprises a surveillance video camera 70 linked to a remote monitoring station 80 and configured to survey the processing of items 5 at said self-checkout apparatus.

15 **[0042]** Embodiments of the inventive self-checkout apparatus further comprises an emergency stop device (not shown) by means of which the apparatus can be turned off in case of an emergency situation.

20 **[0043]** The present invention has been described with reference to exemplifying embodiments. However it should be understood that further modifications can be made without falling outside the scope of the invention which is only delimited by the claims.

Claims

- 25 1. A self-checkout apparatus for processing items (5) represented by respective identity codes, which items (5) are selectable for purchase, **characterised by:**
- 30 - a security tunnel (12) for passing through a shopping carrier (10) with selected items placed therein;
- 35 - a measuring device (13) at said security tunnel (12), for determining a collected characteristics value for the items (5) placed in the shopping carrier (10);
- 40 - an identifier mechanism for determining the identity codes for the items (5) placed in the shopping carrier (10); and
- 45 - a self-service financial device (30, 50, 60) configured to retrieve stored characteristics values of said items (5) based on the determined identity codes, to compare the retrieved characteristics values with the collected characteristics value, and configured to accept purchase dependent on the comparison.
- 50 2. A self-checkout apparatus according to claim 1, wherein said identifier mechanism comprises a communication device, arranged to communicate with a scanner (6, 16) configured to read an identity code in the form of a bar code on said items (5).
- 55 3. A self-checkout apparatus according to claim 2, wherein said scanner (6, 16) is a self-scanner (6), devised to be used by a customer for reading the bar codes, and wherein the communication device is communicatively connectable to the self-scanner (6)

for determining the read identity codes.

4. A self-checkout apparatus according to any preceding claim, further comprising an RFID scanner (16) arranged in said security tunnel (12), configured to read an RFID tag on said items (5) for determining the read identity codes.
5. A self-checkout apparatus according to any preceding claim, wherein said measuring device (13) is a weighing device (13) configured to weigh said shopping carrier (10) with said items (5).
6. A self-checkout apparatus according to claim 5, wherein said self-service financial device (30, 50, 60) is configured to compare the determined collected weight of said items (5) with the retrieved stored weight of the items (5).
7. A self-checkout apparatus according to any preceding claim, further comprising a conveyor (14) configured to transport said shopping carrier (10) from a first position (I) outside said security tunnel (12) to a second position (II) within said security tunnel (12), at which second position (II) said measuring device (13) determines characteristics of said items (5).
8. A self-checkout apparatus according to claim 7, wherein said conveyor (14) comprises a first conveyor part (14a), a second conveyor part (14b) and a third conveyor part (14c), said first and third conveyor parts (14a, 14c) are configured as an entrance ramp from a first level to a second level and an exit ramp from said second level to said first level, respectively, and said second conveyor part (14b) is located at said second level between said first and third conveyor parts (14a, 14c).
9. A self-checkout apparatus according to claim 7 or 8, wherein said conveyor (14) comprises a magnetic track (15) configured to lock at least one wheel (11) of the shopping carrier (10) by activating a magnetic locking means (11a) of the wheel (11).
10. A self-checkout apparatus according to claim 9, wherein said magnetic track (15) is arranged such that the wheel (11) is locked while the shopping carrier (10) is transported on said conveyor (14) from a first end (15a) of the magnetic track (15) to a second end (15b) of the magnetic track (15).
11. A self-checkout apparatus according to any preceding claim, further comprising an indicator (40) communicatively connected to said self-service financial device (30, 50, 60) and configured to generate a signal indicative of the comparison result.
12. A self-checkout apparatus according to any preceding claim, wherein said security tunnel (12) comprises deactivation means (18) for deactivating security tags on said items (5).
13. A self-checkout apparatus according to claim 12, wherein said deactivation means (18) for deactivating security tags is communicatively connected to said self-service financial device (30, 50, 60) and configured to deactivate said security tags if said retrieved characteristics matches said measured characteristics within a predetermined tolerance.
14. A self-checkout apparatus according to any preceding claim, wherein said self-service financial device (30, 50, 60) is communicatively connected to a security gate (20) located at an exit end of a customer passageway, said security gate (20) is arranged to be opened in response to the customer making payment for the total amount of items (5).
15. A self-checkout apparatus according to claim 14, further comprising an alarm device (22) configured to sound an alarm if an item (5) having an activated security tag is at a distance within the coverage of said security gate (20).
16. A self-checkout apparatus according to any preceding claim, wherein said self service financial device (30, 50, 60) comprises an interactive terminal (30), a card reader (50) and a terminal for cash payment (60).
17. A self-checkout apparatus according to claim 16, wherein said interactive terminal (30) is configured to guide a customer through a merchandise purchasing transaction, the interactive terminal (30) being configured to provide instructions to the customer at various stages of the transaction.
18. A self-checkout method for processing items (5) represented by respective identity codes, which items (5) are selectable for purchase, said method comprising the steps of:
 - collecting items (5) in a shopping carrier (10);
 - placing said shopping carrier (10) in a security tunnel (12);
 - determining a collected characteristics value for said items (5) when placed in said shopping carrier (10) using a measuring device (13);
 - determining the identity codes for the items (5) placed in the shopping carrier (10);
 - retrieving stored characteristics values of said items (5) based on the determined identity codes;
 - comparing said retrieved characteristics values with said collected characteristics value; and

- accepting purchase dependent on the comparison.

- 19.** A self-checkout method according to claim 18, further comprising the step of reading an identity code in the form of a bar code on said items (5). 5
- 20.** A self-checkout method according to any of claim 18 - 19, further comprising the step of weighing said shopping carrier (10) with said items (5) by means of said measuring device (13). 10
- 21.** A self-checkout method according to any of claim 18 - 20, further comprising the step of transporting said shopping carrier (10) from a first position (I) outside said security tunnel (12) to a second position (II) within said security tunnel (12), at which second position (II) said measuring device (13) determines said characteristics values of said items (5). 15
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- 22.** A self-checkout method according to any of claim 21, further comprising the step of locking at least one wheel (11) of the shopping carrier (10) by activating a magnetic locking means (11a) of the wheel (11) by means of a magnetic track (15). 25
- 23.** A self-checkout method according to any of claim 18 - 22, further comprising the step of generating a signal indicative of the comparison result. 30
- 24.** A self-checkout method according to any of claim 18 - 23, further comprising the step of deactivating security tags on said items (5). 35
- 25.** A self-checkout method according to claim 24, further comprising the step of deactivating said security tags if said retrieved characteristics matches said measured characteristics within a predetermined tolerance. 40
- 26.** A self-checkout method according to any of claim 18 - 25, further comprising the step of opening a security gate (20) in response to the customer making payment for the total amount of items (5). 45
- 27.** A self-checkout method according to claim 26, further comprising the step of sounding an alarm if an item (5) having an activated security tag is at a distance within the coverage of security gate (20). 50
- 28.** A self-checkout method according to any of claim 18 - 27, further comprising the step of guiding a customer through a merchandise purchasing transaction by providing instructions to the customer at various stages of the transaction. 55

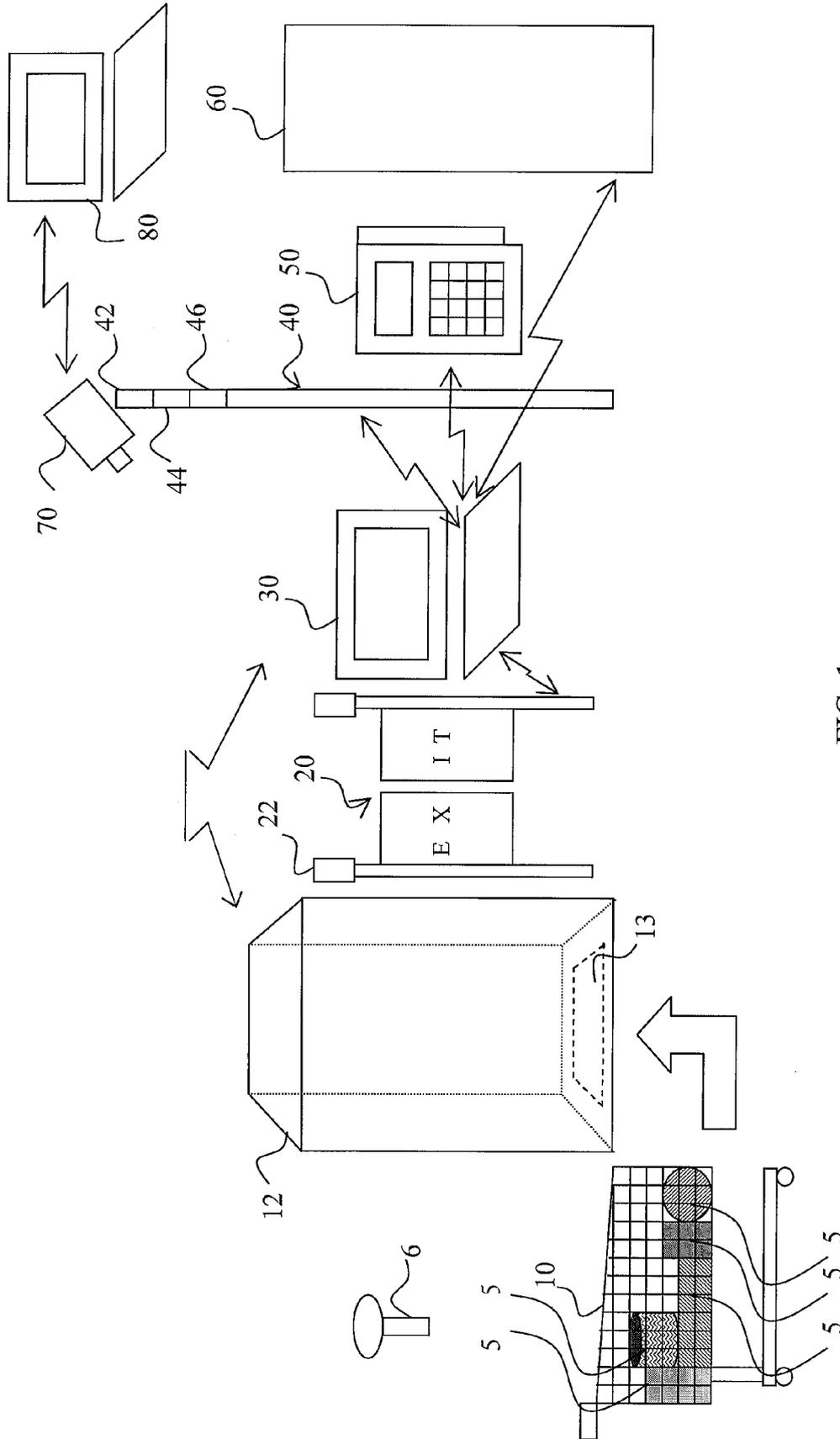


FIG. 1



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	US 5 540 301 A (DUMONT ET AL) 30 July 1996 (1996-07-30) * abstract * * column 3, line 10 - line 67 * * column 4, line 44 - column 5, line 56 * * column 6, line 41 - line 53 * * figures *	1-28	G07G1/00
X	WO 91/19961 A (DANSAM HOLDINGS LIMITED) 26 December 1991 (1991-12-26) * page 1, line 30 - page 2, line 34 * * page 3, line 14 - line 18 * * page 5, line 9 - page 6, line 9 * * page 8, line 16 - line 21 * * page 9, line 15 - line 35 * * page 10, line 14 - line 35 * * figures 1,3,4 *	1-28	
X	EP 0 986 035 A (INTERNATIONAL BUSINESS MACHINES CORPORATION; INTERNATIONAL BUSINESS MA) 15 March 2000 (2000-03-15) * abstract * * paragraph [0005] * * paragraph [0012] - paragraph [0014] * * paragraph [0018] - paragraph [0020] * * paragraph [0026] * * paragraph [0032] - paragraph [0035] * * figures 1,6,7 *	1-28	TECHNICAL FIELDS SEARCHED (Int.Cl.7) G07G
X	WO 03/019487 A (BURKE, MARK, ANTHONY) 6 March 2003 (2003-03-06) * abstract * * page 2, line 13 - line 20 * * page 3, line 17 - page 4, line 5 * * page 4, line 20 - page 5, line 2 * * page 6, line 1 - line 21 * * page 7, line 20 - page 8, line 5 * * figures 1,2,6 *	1-28	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 19 July 2005	Examiner Königer, A
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	



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)
A	FR 2 658 059 A (CROCY JEAN LOUIS) 16 August 1991 (1991-08-16) * abstract * * page 1, line 29 - line 33 * * page 2, line 4 - line 37 * * page 3, line 6 - line 16 * * figures * -----	1-28	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 19 July 2005	Examiner Königer, A
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 05 10 3563

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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19-07-2005

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5540301 A	30-07-1996	US 5437346 A	01-08-1995
		US 5584362 A	17-12-1996
		US 5587703 A	24-12-1996
		US 5641039 A	24-06-1997
		US 5551531 A	03-09-1996

WO 9119961 A	26-12-1991	AU 7979991 A	07-01-1992
		AU 7980091 A	07-01-1992
		AU 7983791 A	07-01-1992
		WO 9119962 A1	26-12-1991
		WO 9120058 A1	26-12-1991
		WO 9119961 A1	26-12-1991

EP 0986035 A	15-03-2000	US 6189789 B1	20-02-2001
		EP 0986035 A2	15-03-2000
		JP 2000123251 A	28-04-2000

WO 03019487 A	06-03-2003	IE 20010789 A2	25-06-2003
		WO 03019487 A2	06-03-2003

FR 2658059 A	16-08-1991	FR 2658059 A1	16-08-1991

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 6837428 B2 [0005] [0006]