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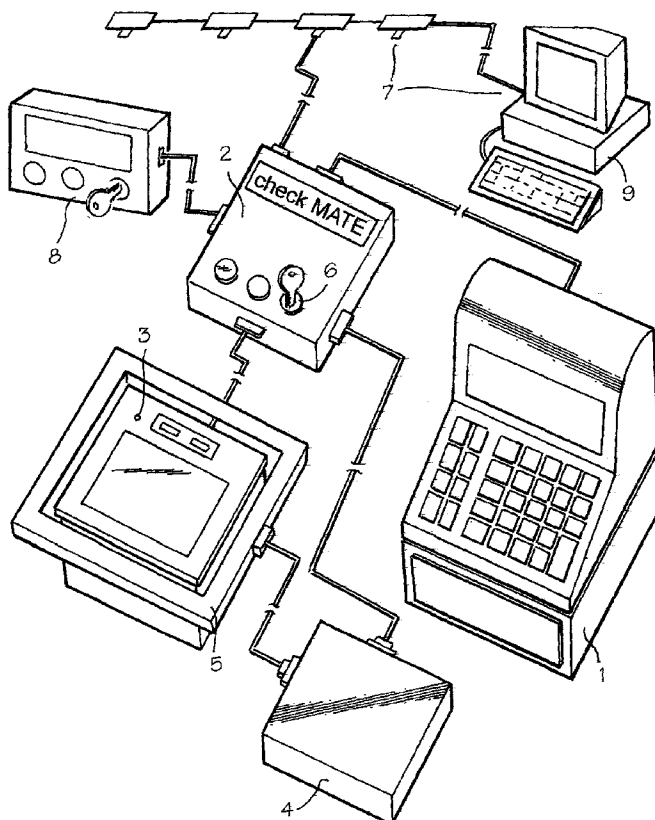
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(54) **A bar code reader and a security tag disabling device in combination**

(57) A system comprising a code reader (3) and a security tag disabling device (5) in combination. The system further comprises a controller (2) which is adapted to interface with code data processing means (1) and which operates to ensure that the security tag disabling

device (5) is not enabled to disable a security tag unless a code is read by the code reader (3) which is associated with a security tag and to ensure that data read by the code reader (3) is not output to the code data processing means (1) if the security tag is not disabled by the security tag disabling device (5).



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## Description

**[0001]** The present invention relates to a security system and more specifically to a security system having particular, but not exclusive application in the retail industry. More specifically the present invention relates to a security system comprising a bar code reader and a security tag disabling device in combination. This specification refers throughout to "bar codes" and "bar code readers". However, it will be understood by the skilled reader that other forms of article identification may be used and that the reader used will be appropriate to this.

**[0002]** Bar code reading systems are widely used throughout the retail industry. Items for sale are marked with a bar code which typically contains a code identifying the product itself and its price. At the sales check-out the bar code is read by a bar code reader and the information contained therein is processed. Bar code reading systems greatly increase efficiency within a retail outlet by speeding up each customer's progress through the sales check-out, reducing transaction errors and providing information to facilitate stock control.

**[0003]** Security tag systems are also widely used throughout the retail industry. Each item for sale, or more usually the high loss items, carries a security tag which can be detected by stand alone tag detectors placed across the store exit points. When an item is validly purchased the security tag is either disabled or removed from the purchase item at the point of sale. If it is not an alarm device is triggered as the tag is carried past the tag detectors.

**[0004]** Basically, there are two types of security tag, these being the "soft tag" and the "hard tag". Both comprise a tuned circuit that resonates when passed through an electromagnetic field, thus facilitating detection. The principle difference between the two is that the "soft tag" is effectively destroyed by subjecting it to a high voltage RF pulse using a tag disabling device positioned at the point of sale, whereas the "hard tag" is removed from the purchase item at the point of sale to be used again on another item. Usually the hard tag is only removable from the purchase item using specialist equipment. This acts as a further deterrent to theft in that if the item is stolen with the hard tag still in place its subsequent removal without the specialist equipment usually results in the destruction or mutilation of the product.

**[0005]** Although both bar code reading systems and security tag systems are well known and widely used they have, hitherto, always been operated totally independently of one another. In certain circumstances this can mean that the effectiveness of both systems may not be total. A problem commonly experienced by retailers now is that of so-called "sweethearting". In this the check-out operator favours an associate purporting to be a genuine customer by passing certain items, usually expensive ones, through the point of sale without allowing them to be read by the bar code reader. All the se-

curity tags are, of course, removed or disabled at the point of sale and the associate is then able to leave the store with all the items, having only paid for a few of them.

**[0006]** A further problem which can arise is that the security tag is not actually disabled or removed by the check-out operator. When this occurs the customer will attempt to exit the store with a legitimately purchased product still bearing a live tag and the store/customer conflict which may ensue as a result is inevitably embarrassing to both parties.

**[0007]** It is an object of the present invention to provide a system comprising a bar code reader and a security tag disabling device in combination which operates to obviate or at least substantially mitigate the problems referred to hereinabove which are encountered with independently operated bar code reading systems and security tag systems.

**[0008]** According to the present invention there is provided a system comprising a code reader and a security tag disabling device in combination, characterised in that the system further comprises a controller which is adapted to interface with code data processing means and which operates to enable the security tag disabling device when a code is read by the code reader which is associated with a security tag and to output data read by the code reader to the data processing means when the security tag has been disabled by the security tag disabling device.

**[0009]** Conveniently, the code takes the form of a bar code and the code reader that of a bar code reader. The bar code itself may contain information signifying the presence of a security tag on the item with which it is used. Alternatively, the system may comprise a look-up chart of bar codes and the presence or absence of a security tag may be input to the look-up table against each bar code, as required. In this way the presence of a tag can be verified by checking the bar code read by the bar code reader against the bar code stored in the look-up table. The look-up chart may be periodically updated from time to time to take account of changes in security tag practice.

**[0010]** It is known to use different types of security tags for different types of item and the system is preferably able to differentiate between different types. Where the security tag is comprised of a tuned circuit different types of tag may have different Q factor and the system differentiates between them by measuring the Q factor. Typically, there are two types of tag, the so-called "soft-tag" which has a low Q factor and the so-called "hard tag" which has a high Q factor. The Q factor of a security tag is conveniently measured by passing it through an electromagnetic field associated with the security tag de-activation device and measuring the amplitude at which it resonates.

**[0011]** Each security tag is verified as being appropriate to the item with which it is associated by checking the bar code of that item either directly or in the look-up

table.

**[0012]** Where the security tag is comprised of a tuned circuit the security tag disabling device may operate to disable it by emitting a high voltage R.F. pulse. Where the security tag cannot be disabled in this way, the security tag disabling device may operate to disable it mechanically. This will typically be the case for security tags which are required to be re-used repeatedly.

**[0013]** When the system according to the present invention is used in a retail environment the code data processing means typically takes the form of a cash register and a store controller. However, the system of the present invention is not restricted to use in retail environments. It may also be employed in stock control applications. In these no money changes hands when a stock item is taken but some form of code data processing means is still required to log the stock items taken and those still remaining in store.

**[0014]** In use, in a retail environment a purchase item is taken to a sales check-out where it is presented to the code reader and to the security tag disabling device. Although the code reader and the security tag disabling device may be separate from each other, the security tag disabling device is conveniently incorporated with the code reader.

**[0015]** The code on the purchase item is read by the code reader and the code data is held over in the controller. Once the controller has the purchase item code, the controller will determine whether or not the product is tagged. This information is obtained either directly from the bar code itself or by checking the bar code against a look-up table held in memory. If the product is determined to be one carrying a security tag which must be disabled the controller will enable the security tag disabling device. Once the security tag is successfully disabled the controller outputs the bar code data to the cash register and the purchase of that purchase item is completed. For convenience this may be indicated to the check-out operator and the customer by audible and/or visual indicator means. If, however, during the operation described above the controller determines via the security tag disabling device that the security tag has not been disabled a warning is given by audible and/or visual indicator means., and the bar code is held over by the controller until appropriate action has been taken.

**[0016]** If the controller determines that the product is not intended to have a security tag fitted, but one is detected the further processing of the transaction can be dealt with according to a set of pre-defined rules. For example, the operator may be warned and further processing of the transaction may be halted until the discrepancy has been resolved. Alternatively, the system may be operated to allow the security tag to be disabled, but a record of the transaction may be made in a transaction log. This has the benefit of avoiding hold-ups at the check out, whilst allowing for multiple discrepancies associated with a particular check-out or check-out operator to be identified from the transaction log.

**[0017]** With the system according to the present invention it should not be possible for an item to be sold without its security tag being disabled. Nor should it be possible for any person to illegally or inadvertently disable a security tag without this being detected by the controller

**[0018]** Since in many stores bar code readers and security tag disabling devices are already in use the controller is intended to interface with the very minimum of changes to the retail system. No changes to store application software are expected to be needed, only small cabling changes to connect the reader, disabling device and cash register up to the controller.

**[0019]** Conveniently, the controller is able to support the major interface types and protocols used between bar code readers and cash register systems. Currently the four main types being RS232, Parallel, OCIA, (Optically coupled interface adapter) and RS485. Due to this flexibility the controller is not limited to a particular article identification system such as bar code scanning, but limited merely by any future interface changes. Similarly regarding the security tag system the controller is not limited to any particular type of tagging system.

**[0020]** Conveniently, the controller has the ability to carry out interface and protocol conversion should this be found useful for a customer to, say, allow a scanner with RS232 communications to be used in conjunction with a cash register supporting only RS485. This feature would apply when a selected type of reader cannot support a cash register interface type or even a certain feature required to suit the store environment.

**[0021]** An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawing which shows a general schematic view of a cash register connected to a system in accordance with the present invention;

**[0022]** Referring to the drawing there is shown a cash register 1 which is connected via a suitable interface to a system according to the present invention. The system comprises a controller device 2 to which is connected a flat bed bar code reader 3 and a security tag disabling device 5 in the form of an RF de-activation coil which for explanatory purposes is shown encircling the bar code reader. The RF de-activation coil is connected to power supply unit 4. Both the bar code reader 3 and the security tag disabling device 5 are of conventional design. The controller 2 comprises a key switch 6 and two push switches 11 which enable the controller 2 to be operated by the check-out operator or supervisor as necessary.

**[0023]** The controller 2 is connected to a server unit 9 via a network 7. The server unit 9 and associated network 7 perform two roles. One is to manage the operation of a number of controllers, each connected to a respective branch of the network 7. The other is to provide report printing and transaction data. As regards controlling management the server can operate in two ways. It can be the source of all the security tagging information and can interact with the controllers in a real time envi-

ronment or alternatively it can hold data or tagging information which is down loaded to each controller at the beginning of each day. With this mode of operation delays in transactions are kept to a minimum as the controllers only have to advise the server of the results of a transaction, and this can be performed at leisure.

**[0024]** In use, the controller 2 operates so as to ensure that when an article carrying a bar code is placed in front of the bar code reader 3 the bar code is read. Once read the bar code is held over in the controller 2. The system is able to check whether the article should carry a security tag from information contained within the bar code or by checking the bar code against a look-up table stored in memory. The system is also able to detect the presence of a security tag within the field of the R.F. deactivation coil where the security tag is of the type which comprises a tuned circuit because the tuned circuit resonates at a set frequency which is then detected. Having established that a security tag is present which requires to be disabled the power supply 4 is operated to send an R.F. pulse of sufficient strength and duration through the coil 5 as to "blow" the security tag. The system is able to check whether the security tag has been successfully disabled by re-checking to see whether the tuned circuit still resonates at the set frequency. When the controller 2 determines that the security tag has been disabled it transfers the bar code data held over to the cash register 1 and the transaction is completed.

**[0025]** If the security tag is a "rogue" tag which is not disabled by the R.F. pulse or a tag is detected when there should be none, this is determined by the controller 2 which is then able to continue processing the transaction according to a predefined set of rules. These rules may require that the transaction is halted until action is taken by the operator or others to correct the situation. Alternatively, the system may allow the transaction to be completed but with a note of the apparent discrepancy being made in a transaction log.

**[0026]** The controller 2 may give visual and/or audible warnings of "rogue" tags in the detection field of the security tag disabling device. However, the visual warnings are only indicated by coloured lights for more user friendly environments, and where far more detailed information is required, a remote control option 8 is available. The remote control unit 8 overrides the switches on the controller 2 and takes operator control directly. This is a smaller unit, and the intention is to install this within easy reach of the operator and locate the controller and all of its associated wiring away from view. The remote unit features controlling switches and an audio output, and also has a much more sophisticated display.

**[0027]** The system is also able to advise the operator of the presence of non-detectable security tags which must be mechanically removed from the item. The presence of these is indicated in the bar code for that item or in the look-up table and a visual or audible warning of their presence is given to the operator.

**[0028]** The system of the present invention has been described with reference to security tags of the type which are detected and disabled electronically, e.g., by using an R.F. signal, but is not limited thereto. The system may also be used tags which are detected and disabled using mechanical means. In this regard, the system can be used with tags which have to be removed from the item or mechanically broken using a dedicated mechanical device.

**[0029]** The other main feature of the system is its total flexibility. The intention is that the controller and remote control unit are both re-programmable. This can be achieved by one of two means, either through the communication port which connects to the bar code scanner, or by transferring the programs from the server to a controller via the network. In both cases both controller and remote unit programs can be updated. Such a system allows updates to be carried out by either a service engineer or by means of a supplied computer disc which the store supervisor would install in the server.

## Claims

1. A system comprising a code reader and a security tag disabling device in combination, characterised in that the system further comprises a controller which is adapted to interface with code data processing means and which operates to enable the security tag disabling device when a code is read by the code reader which is associated with a security tag and to output data read by the code reader to the data processing means when the security tag has been disabled by the security tag disabling device.
2. A system according to Claim 1, characterised in that the code takes the form of a bar code and the code reader that of a bar code reader.
3. A system according to Claim 1 or 2, characterised in that code contains information signifying the presence of a security tag on the item with which it is used.
4. A system according to Claim 1 or 2, characterised in that a look-up table is provided in memory which indicates for each code the presence or absence of a security tag.
5. A system according to any preceding Claim, characterised in that the system further comprises means for detecting the presence of a security tag.
6. A system according to Claim 5, characterised in that the security tag detecting means is able to detect the resonant frequency of a tuned circuit.

7. A system according to Claim 5 or 6, characterised in that the security tag detecting means is able to differentiate between different types of security tag.
8. A system according to Claim 6 and 7, characterised in that the security tag detecting means is able to determine the Q factor of a tuned circuit. 5
9. A system according to any preceeding Claim, characterised in that the security tag disabling means operates electronically to disable security tags. 10
10. A system according to Claim 9, characterised in that the security tag generates an R.F. pulse to disable security tags. 15
11. A system according to any of Claims 1 to 9, characterised in that the security tag disabling means operates mechanically to disable security tags. 20
12. A system according to any preceding Claim, wherein, the controller is able to support the major interface types and protocols used between bar code readers and cash register systems. 25
13. A system according to Claim 12, wherein the protocol used is one of RS232, Parallel, OCIA, (Optically coupled interface adapter) and RS485.
14. A system according to Claim 12 or 13, wherein the controller is able to carry out interface and protocol conversion. 30

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