

the control programs in either the ROM 212 or the hard disk 214 of the computers 21B and 22B respectively, and are executed by the CPU 21.

[0122] In FIG. 8, the computer 21B installed in the securities company waits for securities information including the dividend wording 3, the interest wording 4, and the warranty wording 5 to be entered (S301: No). The operator at the securities company enters into the computer 21B via the input device 216 the dividend wording 3, the interest wording 4, and the warranty wording 5 for a specific securities as well as other securities information as indicated in the aforementioned first embodiment.

[0123] When the computer 21B receives the securities information including the dividend wording 3, the interest wording 4, and the warranty wording 5 (S301: Yes), it generates an electronic securities certificate based on the received securities information (S302). The electronic securities certificate mentioned here is a version based on electronic data of the securities certificate shown in the first embodiment (FIG. 1), and contains the wording 1 for the title of the securities, the wording 2 for the face value, the dividend wording 3, the interest wording 4, and the warranty wording 5 for the specific securities as well as the electronic signature of the securities issuer (business operator) for guarantying the legitimacy of the securities certificate. Moreover, such an electronic securities certificate is provided with a specified copy protection for the purpose of preventing illegal modification or copying. The computer 21B records the generated electronic securities certificate in the hard disk 214 (S303), and transmits simultaneously the electronic securities certificate to the computer 22B owned by the investor via the network interface 217 and the network 23B (S304). The procedure of the transmission of the securities information in the step S304 can be automatically done according to the securities information input procedure in the step S302, or can be performed upon receiving the transmission request from the computer 22B owned by the investor.

[0124] In FIG. 9, upon receiving the electronic securities certificate including the dividend wording 3, the interest wording 4, and the warranty wording 5 from the computer 21B owned by the investor via the network 23B and the network interface 217 (S401), the computer 22B stores the received electronic securities certificate into the hard disk 214 (S402), and displays its contents on the display unit 215 (S403).

[0125] In this embodiment, the electronic securities certificate can be circulated through the network as the original of the securities certificate, so that the investor can purchase the contents of the securities according to the present information from his/her office or home and instantaneously obtain the certificate of any desired securities through online procedures using the computer 22B. Moreover, the securities company can sell the securities according to the invention through the network alone and is freed from the burden of mailing the securities certificate later.

[0126] Further, the computer 22B can be a type which prints out the contents of the electronic securities certificate by means of the printer 24, in addition to or instead of displaying them on its display unit. In other words, it is possible to provide the electronic securities with a protection electronically so that it can be printed only once, so that the

only one copy of the securities certificate can be printed and circulated through the market as its original. In this case, with reference to FIG. 9, the computer 22B waits for the printing instruction of the electronic securities certificate (S404), generates a print job of the contents of the electronic securities certificate recorded on the hard disk 214 (S405), and transmits the print job to the printer 24 (S406). The printing output protection applied on the electronic securities certificate as mentioned above does not have to be a type that limits the printing to only once, but can be a multiple print type (with protection) or a no-limit type (i.e., no protection).

[0127] In another embodiment of the invention, a buy operation proceeds as follows. The customer keys in the details of the desired securities and inserts the payment card in the card reader. The ASD 105 conveys this to the securities dealing financial institution via the ASD host 101 and gets back the information (including cryptographic checksum) to print on the hardcopy certificate as well as the type of paper to use. The ASD 105 then prints the certificate on the appropriate paper, takes a scan (if needed for unforgeability, as explained later), and dispenses the hardcopy certificate to the customer. A sell operation proceeds as follows. The customer inserts a printed hardcopy certificate in the document scanner and payment method in the card reader. The ASD 105 scans the hardcopy certificate, conveys the results of the scan to the ASD host 101 for validation of a cryptographic checksum and a fingerprint (if applicable). If valid, the ASD host 101 makes payment, following which the ASD 105 voids the hardcopy certificate (e.g., prints "VOID" on it). If invalid, the transaction is cancelled.

[0128] The ASD 105 interacts with customers at the "front-end" and is connected to a remote ASD host 101 at the "back-end" (just as ATM machines connect to a remote ATM host machine) as depicted in FIG. 13. The ASD 105 is similar to an ATM in terms of hardware components except for a printer-scanner. The ASD 105 has a PC-like computer 131 (consisting of 1 CPU 133, a RAM 135, a ROM 139, and a disk 151) that controls the operation of the ASD. The ASD 105 also has a cryptoprocessor 141 for executing the cryptography software for secure communication between ASD 105 and ASD host 101 (and for computing cryptographic checksums, if that is done at the ASD). The cryptoprocessor is a dedicated processor embedded in a packaging with multiple physical security measures, which give it a degree of tamper resistance. The ASD 105 has the following input-output devices 161 for interaction with the customer: a print-scan device 163, a card reader 165 for retrieving a payment method (e.g., debit card), a keypad 167 for a customer to enter the details of the task to be performed (e.g., whether to buy or sell a hardcopy certificate, what kind of hardcopy certificate to buy, PIN code for the payment card), and a display 169 for informing the customer the status of the current transaction and prompts the customer for inputs.

[0129] The print-scan device 163 has the following capabilities: It has access to ordinary paper and one or more types of special paper. It can print information supplied by the computer on the type of paper indicated by the computer, take a scan of the printed document, and dispense the printed document to the customer. It can accept a printed hardcopy certificate inserted by the customer, take a scan of the document, forward the scan to the computer, then either