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(54) **Machine for sorting securities**

(57) Machine for sorting securities each having an individual sign. The machine has a detector device for measuring momentaneous values of a number of parameters of a separate security and for generating a corresponding measuring signal, and a computer with a sorting algorithm connected to the detector device for receiving the measuring signals issued by it. The computer issues sorting signals to a sorting means on the basis of the measuring signals and the sorting algorithm, which sorting means sorts the securities in reaction to it. The computer has a file including a correspondence list, in which correspondence list the individual sign of each separate security and original values of the number of parameters are included immediately after manufacture of the security concerned, and with a file of sorting algorithms. The detector device has a sign detector for the detection of an individual sign, for generating a sign indication signal and for issuing the sign indication signal to the computer. The computer chooses an accompanying sorting algorithm in reaction to a sign indication signal via the original values. Alternatively the computer has a file including a correspondence list, in which correspondence list the individual sign of each separate security and an accompanying sorting algorithm are included. The detector device has a sign detector for the detection of an individual sign, for generating a sign indication signal and for issuing the sign indication signal to the computer. In reaction to a sign indication signal the computer chooses the sorting algorithm from the algorithm file, which according to the correspondence list belongs to it. The detector device may be a clean/dirty detector device or an authenticity characteristics detector device.

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Description

[0001] The present invention relates to a machine for sorting securities, such as bank notes, each security being provided with an individual sign, which machine is provided with a detector device, in particular a clean/dirty detector device or an authenticity characteristic detector device, for measuring momentaneous values of a number of parameters of a separate security and for generating a measuring signal per momentaneous value, with a computer provided with a sorting algorithm connected to the detector device for receiving the measuring signals issued by it, which computer issues sorting signals on the basis of the measuring signals and the sorting algorithm, and with a sorting means connected to the computer for the reception of the sorting signals and for sorting the securities in reaction to it.

[0002] Such sorting machines have been used for quite some time now, and depending on the security to be sorted and the wishes of the user of the machine, the detector device may for instance measure the reflection, transmission and/or damage of the security. If, for instance insufficient or incorrect reflection is measured, the sorting means is able to sort said security as insufficient or incorrect on the basis of that information. To that end the detector device is provided with a certain algorithm which on the basis of the reflection measured and a sufficient or correct reflection value (or a range of sufficient or correct reflection values) sorts the security. Additionally it is known to first of all measure all necessary parameters, and to process these parameters in an algorithm which on the basis of the parameters measured and pre-entered values calculates whether the security meets the requirements or not, and thus sorts the securities.

[0003] Although such known sorting machines function satisfactorily, it appears in a number of cases that securities, in particular bank notes, which are sorted as not meeting the desired values, nonetheless can be used. On the other hand bank notes which have successfully passed the sorting process appeared to be incorrect.

[0004] It is therefore an object of the present invention to provide a machine for sorting securities, such as bank notes, which more accurately yet in a simple manner sorts securities.

[0005] To that end a machine of the kind described above according to the invention is characterized in that the computer is provided with a file including a correspondence list, in which correspondence list the individual sign of each separate security and original values of the number of parameters are included immediately after manufacture of the security concerned, and with a file of sorting algorithms, and in that the detector device is provided with a sign detector for the detection of an individual sign, for generating a sign indication signal and for issuing the sign indication signal to the computer, and in that the computer chooses an accompanying

sorting algorithm from the algorithm file in reaction to a sign indication signal via the original values. The present invention is based on the insight that each security has separate characteristics, irrespective of how accurate its manufacture takes place. The known sorting machines sort on the basis of an average value which may adopt any characteristic. As a result it may for instance occur that a newly printed bank note is nonetheless branded as dirty or not meeting the requirements, which is undesirable and leads to unnecessary waste. By storing the values of the relevant number of parameters of each separate security in a file immediately after a security has been manufactured, the sorting machine is able with the help of a computer to compare the momentaneous values of a separate security to the original values by means of an accompanying algorithm, which allows for a much more accurate sorting. Choosing the sorting algorithm can take place via the original values, in other words certain values are accompanied by certain algorithms, or via the detected individual sign, in other words each security is accompanied by one algorithm. This situation in which each security is accompanied by one algorithm is the most optimal in sorting securities.

[0006] Preferably the sorting algorithm is identical for a group of separate securities, of which group at least one of the number of parameters is at least almost identical. When for instance a group of bank notes is printed on a certain kind of paper originating from one single stock, said group as paper parameters are concerned, will show an at least almost identical value after measuring/detection. When a new stock of paper is used, the paper parameters, however accurately one tries to make the various stocks identical to each other, will be different from each other. As a result one (or more) common original values for the parameters have to be included in the file for a whole group of bank notes.

[0007] Preferably the individual sign also contains an indication of the country of origin, which country indication is qualifying for choosing the sorting algorithm. In some cases choosing an algorithm exclusively based on the country of origin would suffice. Particularly when the security is a Euro bank note, the algorithm could be chosen on the basis of the country detected after detecting the sign. Preferably the individual sign then is the serial number of the security.

[0008] As sorting machines have been used for quite some time now, and as a result sorting machines are known to the expert, a further description of them will be left out here. It is known that depending on the security to be sorted and the wishes of the user of the machine, the detector device contains one or several detectors. For example detectors for detecting for instance reflection, transmission, and/or damage of a security, such as a bank note, can be provided. The values measured by said detectors are compared to a reference value in a computer, generally with the help of an algorithm. If the values measured do not tally with

the reference values, the security is sorted off. This sorting off may take place immediately after the detector concerned, or not until all values have been measured and all these values have been processed in an algorithm. Sorting off can also take place when the security is not clean enough. The detector device can also be used for the detection of authenticity characteristics.

[0009] The present invention, which is particularly but not exclusively suitable for sorting Euro bank notes, adds a file to it, which is accommodated in the computer. In this file a correspondence list is included, which preferably contains the individual sign of each separate security and original values of the number of parameters immediately after manufacture of the security concerned. The computer also contains a file of sorting algorithms. The detector device is further provided with a sign detector for detecting an individual sign, for generating a sign indication signal and for issuing the sign indication signal to the computer. The computer chooses an accompanying sorting algorithm from the algorithm file in reaction to a sign indication signal via the original values, with the help of which algorithm the security can be sorted. Choosing the sorting algorithm can take place via the original values, in other words certain values are accompanied by certain algorithms, or via the detected individual sign, in other words each security is accompanied by one algorithm. This situation in which each security is accompanied by one algorithm, is the most optimal in sorting securities.

[0010] The implementation of the present invention, with the measures and preferences described above, will be easy for the expert to carry out, without giving a further description of each of these measures. It is noted here that the detector device may be a clean/dirty detector or an authenticity characteristics detector device. In both cases a certain limiting value or a certain pattern recognition algorithm can be chosen depending on a country code or on another characteristic.

Claims

1. Machine for sorting securities, such as bank notes, each security being provided with an individual sign, which machine is provided with a detector device for measuring momentaneous values of a number of parameters of a separate security and for generating a measuring signal per momentaneous value, with a computer provided with a sorting algorithm connected to the detector device for receiving the measuring signals issued by it, which computer issues sorting signals on the basis of the measuring signals and the sorting algorithm, and with a sorting means connected to the computer for the reception of the sorting signals and for sorting the securities in reaction to it, **characterized in that** the computer is provided with a file including a correspondence list, in which correspondence list the individual sign of each separate security and
2. Machine for sorting securities, such as bank notes, each security being provided with an individual sign, which machine is provided with a detector device for measuring momentaneous values of a number of parameters of a separate security and for generating a measuring signal per momentaneous value, with a computer provided with a sorting algorithm connected to the detector device for receiving the measuring signals issued by it, which computer issues sorting signals on the basis of the measuring signals and the sorting algorithm, and with a sorting means connected to the computer for the reception of the sorting signals and for sorting the securities in reaction to it, **characterized in that** the computer is provided with a file including a correspondence list, in which correspondence list the individual sign of each separate security and an accompanying sorting algorithm are included, and in that the detector device is provided with a sign detector for the detection of an individual sign, for generating a sign indication signal and for issuing the sign indication signal to the computer, and in that in reaction to a sign indication signal the computer chooses the sorting algorithm from the algorithm file, which according to the correspondence list belongs to the sign indication signal.
3. Machine according to claim 2, **characterized in that** the sorting algorithm belonging to each separate security with an individual sign is based on the values of the number of parameters immediately after manufacturing the security concerned.
4. Machine according to claim 1 or 2, **characterized in that** the sorting algorithm is identical for a group of separate securities, of which group at least one of the number of parameters is at least almost identical.
5. Machine according to any one of the preceding claims, **characterized in that** the individual sign also contains an indication of the country of origin, which country indication is qualifying for choosing the sorting algorithm.
6. Machine according to any one of the preceding claims, **characterized in that** the security is a Euro

bank note.

7. Machine according to any one of the preceding claims, **characterized in that** the individual sign is the serial number of the security. 5
8. Machine according to any one of the preceding claims, **characterized in that** the detector device is a clean/dirty detector device. 10
9. Machine according to any one of the preceding claims, **characterized in that** the detector device is an authenticity characteristic detector device. 15

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EUROPEAN SEARCH REPORT

Application Number
EP 00 20 0982

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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
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Place of search	Date of completion of the search	Examiner	
THE HAGUE	11 July 2000	Kirsten, K	
CATEGORY OF CITED DOCUMENTS		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	
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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