(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 455 920 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
23.05.2012 Bulletin 2012/21

(51) Int Cl.:
G07D 11/00 *(2006.01)* ***E05G 1/14*** *(2006.01)*

(21) Application number: **11161208.1**

(22) Date of filing: **05.04.2011**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **21.11.2010 IL 20948310**

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(54) Secure transfer of banknotes

(57) A method of secure transfer of banknotes, including, loading banknotes into one or more security bags with a tamper proof seal; wherein the security bags have a first face including the seal and made from standard bag material, and a second face made from a mesh material that allows liquid to enter the bag; wherein the width of the bags is wider than the width of the banknotes such that when the banknotes are positioned near one side of the bag an extra portion is left over, folding over the extra portion of the security bag so that the first face of the bag is facing the first face of the extra portion to form an ink collection base; wherein the first face has perforations at least in the area of the ink collection base, positioning the security bags in an ink box that includes an inking system that releases ink from its top to its bottom if security of the ink box is breached; wherein the ink collection base is placed on the bottom of the box and the security bags extend upward toward the top of the box; closing the box; and activating the inking system of the box.

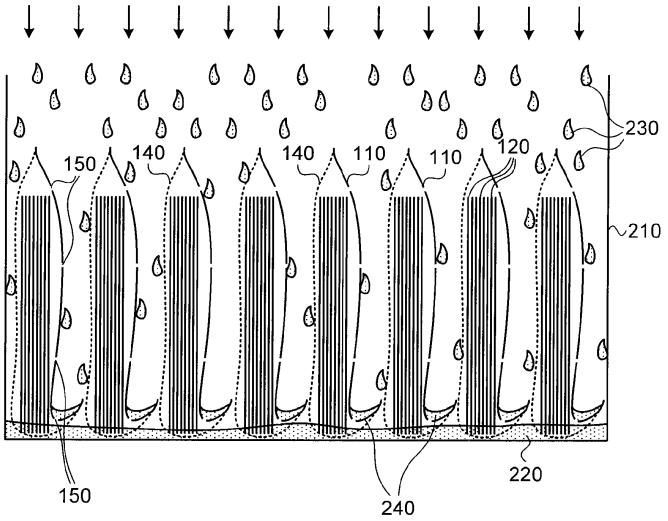

FIG. 2

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Description

FIELD OF THE INVENTION

[0001] The present invention relates generally to a system and method for the secure transfer of banknotes and more specifically to systems and methods employing an ink box to deface the banknotes if security is breached.

BACKGROUND OF THE INVENTION

[0002] The transfer of banknotes is generally performed using security bags (or envelopes) that include a tamper proof seal. This allows the shipper to seal a specific number or type of banknotes in each bag and the receiver can verify that they arrive as shipped. Typically multiple smaller bags may be sealed in a larger bag to assure that a group of bags arrive untouched. The receiver can then easily use the banknotes without having to resort them and/or recount them. Generally such bags are made from materials that protect the banknotes and prevent liquids from reaching them.

[0003] Banknotes during transport (referred to as cash in transit (CIT)) are also vulnerable to theft, for example armored cars transporting banknotes have been attacked and the contents have been stolen. To prevent such attacks theft deterrent systems such as ink boxes also known as CIT boxes have been developed to discourage theft of cash in transit. One common method uses ink boxes that release an indelible ink onto the banknotes in the box if the box it tampered with. Typically a CIT system may contain multiple drawers each one serving as an ink box. The drawers are positioned into the CIT system and the system is locked and armed. If an attempt is made to obtain unauthorized access to the banknotes the inking system is triggered and the contents of the boxes are defaced.

[0004] To deter theft it is required to deface close to 100% of the banknotes by at least 10% of their surface so that the banknotes are rendered useless and there will be no point in hijacking such a transport. However the use of one or more layers of standard polyethylene tamper evident security bags to group the banknotes in the boxes hinders the inking process.

[0005] One way of increasing the inking ability is by using security bags made from a mesh material to allow the ink to reach the banknotes through the holes of the mesh material. One problem with the use of a mesh material bag is that the mesh material is not suitable for printing on (e.g. a barcode or a warning message) and for forming a tamper proof seal. Therefore one side of the security bag is made from standard bag material such as polyethylene and the other side is made from the mesh material. However the non mesh side serves as a barrier and inhibits spreading of the ink and defacing close to 100% of the banknotes.

SUMMARY OF THE INVENTION

[0006] An aspect of an embodiment of the invention, relates to a method of transferring banknotes in an ink box system using security bags. The banknotes are initially placed in security bags with tamper proof seals. The security bags have two faces, a first face made of standard bag material (e.g. polyethylene) and a second face made from a mesh material that allows liquids to enter the bag and reach the banknotes. The security bags are designed to allow placing up to a specific number of banknotes in each bag. Optionally, the width of the security bag is designed so that an extra portion is left over and the extra portion can be folded over with its first face meeting the first face of the rest of the security bag.

[0007] In an exemplary embodiment of the invention, the first face has perforation in various places along the face of the bag especially in the area of the fold.

[0008] In an exemplary embodiment of the invention, each of the security bags is placed with the folded portion on the bottom forming an ink collection base. Multiple security bags are placed standing up side by side in an ink box to assure defacement of all the banknotes in case of a security breach. In some embodiments of the invention, all the security bags are placed with the first face facing a second face of the adjacent bag. Alternatively, the security bags may be placed with the first face facing a first face of an adjacent bag and the second face facing a second face of an adjacent bag.

[0009] In some embodiments of the invention, a larger security bag, referred to as an over-pack security bag is used to group together multiple security bags to assure that the entire group is not tampered with. The over-pack bag is placed in the ink box with the security bags positioned inside as if they are positioned directly inside the ink box. The over-pack bag is positioned with the mesh material positioned upward facing the ink release system of the ink box.

[0010] In some embodiments of the invention, multiple over-pack security bags may be used to group some of the security bags in one group and some in another group.

[0011] There is thus provided according to an exemplary embodiment of the invention, a method of secure transfer of banknotes, including:

loading banknotes into one or more security bags with a tamper proof seal; wherein the security bags have a first face including the seal and made from standard bag material, and a second face made from a mesh material that allows liquid to enter the bag; wherein the width of the bags is wider than the width of the banknotes such that when the banknotes are positioned near one side of the bag an extra portion is left over;

folding over the extra portion of the security bag so that the first face of the bag is facing the first face of the extra portion to form an ink collection base;

wherein the first face has perforations at least in the area of the ink collection base;
positioning the security bags in an ink box that includes an inking system that ejects ink from its top to its bottom if security of the ink box is breached;
wherein the ink collection base is placed on the bottom of the box and the security bags extend upward toward the top of the box;
closing the box; and
arming the inking system of the box.

[0012] In some embodiments of the invention, the method further comprises:

positioning the security bags in a larger over-pack security bag instead of directly in the ink box and placing the over-pack security bag in the ink box;
wherein the side of the over-pack security bag facing upward is made of mesh material and the side facing toward the bottom of the box is made from standard bag material.

[0013] Optionally, the side facing the bottom of the box includes perforations like the smaller security bags. In an exemplary embodiment of the invention, the security bags are aligned in the ink box to be positioned such that the first face of one bag is facing the second face of the bag next to it. Alternatively, the security bags are aligned in the ink box to be positioned such that the first face of one bag is facing the first face of the bag next to it and the second face of the bag is facing the second face of the bag next to it. In an exemplary embodiment of the invention, the perforations on the first face of the security bag form a matrix of perforations. Alternatively, the perforations on the first face of the security bag are spread out randomly.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The present invention will be understood and better appreciated from the following detailed description taken in conjunction with the drawings. Identical structures, elements or parts, which appear in more than one figure, are generally labeled with the same or similar number in all the figures in which they appear, wherein:

Fig. 1 is a schematic illustration of a security bag with banknotes deployed therein, according to an exemplary embodiment of the invention;
Fig. 2 is a schematic illustration of a cross sectional view of security bags deployed in an ink box, according to an exemplary embodiment of the invention;
Fig. 3 is a schematic illustration of a perspective view of a first face of a folded security bag for deploying in an ink box, according to an exemplary embodiment of the invention;
Fig. 4 is a schematic illustration of a perspective view of a second face of a folded security bag for deploying in an ink box, according to an exemplary embodiment of the invention;
Fig. 5 is a schematic illustration of an over-pack bag with multiple security bags deployed therein, according to an exemplary embodiment of the invention;
Fig. 6 is a flow diagram of a method of arranging security bags with banknotes deployed inside in an ink box, according to an exemplary embodiment of the invention; and
Fig. 7 is an alternative arrangement of security bags inside in an ink box, according to an exemplary embodiment of the invention.

DETAILED DESCRIPTION

[0015] Fig. 1 is a schematic illustration of a security bag 100 with banknotes 120 deployed therein, according to an exemplary embodiment of the invention. In an exemplary embodiment of the invention, security bags 100 meet specific limitations as described below and will be deployed according to specific rules to achieve a desired level of protection for the banknotes during transfer. Optionally, the method is applicable to any monetary item that loses it value by being defaced with an indelible ink, so that it can later be replaced without causing serious loss to the owner. In the case of banknotes: the banknotes can be considered unusable even if they are not recovered, since the method assures defacing close to 100% of the banknotes. Accordingly, the government can replace banknotes shipped using the method described herein. Security bag 100 includes a tamper proof seal 130, so that the receiver of such a bag is assured that the content was not tampered with during transport. Optionally, security bag 100 includes a first face 110 from standard bag material, such as polyethylene, paper, or other appropriate material to allow forming tamper proof seal 130 and optionally, printing a barcode or other details on security bag 100.

[0016] In an exemplary embodiment of the invention, the second face 140 of security bag 100 is made from a mesh material, so that ink can pass through the mesh side of security bag 100 and deface the contents inside. In some embodiments of the invention, the first face includes perforations 150, for example to allow ink to enter security bag 100 from specific locations on the first face. Optionally the perforations 150 form a matrix with a preselected distance (x,y) between the perforations 150 along the length (x) and width (y) of the security bag. Alternatively, the perforations 150 may be spread out randomly. In an exemplary embodiment of the invention, the perforations 150 have a diameter of between 1mm to 10 mm. alternatively; the perforations may be larger or smaller.

[0017] In an exemplary embodiment of the invention, the length of security bag 100 is designed to enable storing up to a specific number of banknotes 120 (e.g. 50 or 100 banknotes), allowing the tamper proof seal 130 to be sealed, and without leaving a significant overhanging

portion on the bottom of the bag. Optionally, in contrast the width of security bag 100 is designed to leave an extra portion with at least one row of perforations 150 to be folded over toward the banknotes (first face 110 toward first face 110 to form an ink collection base). Optionally the overhanging portion is between 1/6 to 1/3 of the width of security bag 100. Alternatively, the overhanging portion may be larger or smaller.

[0018] Fig. 2 is a schematic illustration of a cross sectional view of security bags 100 deployed in an ink box 210, according to an exemplary embodiment of the invention. In an exemplary embodiment of the invention, ink box 210 is designed to have a width approximately matching the length of security bag 100, which as explained above is designed to relate to the length of banknotes 120.

[0019] In an exemplary embodiment of the invention, multiple security bags 100 are placed in a row with the first face 110 of one security bag facing the second face 140 of the succeeding bag. Optionally, the security bags 100 may be placed loosely next to each other with the folded portion (marked as fold 240) forming a wide collection base extending from the side of the security bags 100. Alternatively, the security bags 100 may be tightly pressed together with the folded portion forming a narrow collection base or even a collection base with the fold almost parallel to the bag. In some embodiments of the invention, ink box 210 may have crevices on the bottom of ink box 210 to guide the positioning of the security bags 100.

[0020] Optionally, when the security of ink box 210 is breached, for example by being pried open without use of a key, then ink drops 230 are dropped or ejected from the top the box toward the bottom. In an exemplary embodiment of the invention, a layer of ink 220 is formed on the bottom of the box. Optionally, the ink drops 230 enter security bag 100 on the second face 140 made from the mesh material while dropping. Additionally, some ink drops 230 enter on the first face 110 through the matrix of perforations 150. In an exemplary embodiment of the invention, the ink collection base formed by fold 240 captures ink falling from the top of ink box 210 causing it to enter into security bag 100 through the at least one row of perforations in the fold as mentioned above. Optionally, ink from the layer of ink formed on the bottom of ink box 210 also seeps in from the second face 140 through the mesh material. Optionally, as a result of the above positioning banknotes 120 are defaced at least on the bottom of all the banknotes 120, on the top of some of the banknotes 120 and especially the two banknotes on either side of the pile of notes in security bag 100. It should be noted that the ink gets absorbed by the banknotes 120 due to capillary attraction causing the ink to seep up from the bottom and deface at least between half a centimeter to a centimeter upward along the entire bottom of the banknotes 120. It should also be noted that a random positioning, for example with security bags one on top of another would leave a portion of the banknotes unmarked.

[0021] Fig. 3 is a schematic illustration of a perspective view of the first face 110 of a folded security bag 110 for deploying in ink box 210, according to an exemplary embodiment of the invention, and Fig. 4 is a schematic illustration of a perspective view of the second face of a folded security bag 110 for deploying in ink box 210, according to an exemplary embodiment of the invention. Optionally, multiple security bags 100 are deployed in ink box 210 side by side as shown in Fig. 2 and described above.

[0022] Fig. 5 is a schematic illustration of an over-pack bag 510 with multiple security bags 100 deployed therein, according to an exemplary embodiment of the invention. Optionally, over-pack bag 510 is a larger tamper proof security bag but otherwise similar to security bag 100. In some embodiments of the invention, multiple security bags 100 are placed side by side in the larger over-pack bag 510 and deployed in ink box 210 according to the method described above, so that the entire group of security bags 100 are protected by a tamper proof seal 550 of the over-pack bag 510 for the benefit of the receiver. Optionally, when deploying the over-pack bag 510 the first face 530 with the standard bag material is positioned downward and the second face 540 with the mesh material is positioned upward in the ink box 210, so that the ink drops 230 are free to flow downward over the multiple security bags 100 as explained above.

[0023] It should be noted that random placement of the security bags 100 directly in ink box 210 or in over-pack bag 510 will lead to random inking of banknotes 120 and will not provide the required results assuring defacement of essentially all the banknotes 120.

[0024] Fig. 6 is a flow diagram 600 of a method of arranging security bags 100 with banknotes 120 therein in an ink box 210, according to an exemplary embodiment of the invention. In an exemplary embodiment of the invention, a user whishing to transfer banknotes or other monetary notes loads (610) the banknotes into a collection of security bags 100. Optionally, each bag may be loaded with a specific number or specific type of banknotes, for example one bag is loaded with 50 banknotes of 100 Euro and one bag with 75 banknotes of 50 Euro. Optionally, each security bag 100 may be addressed to a different person or different deposit box at the location of the receiver. In an exemplary embodiment of the invention, the number of banknotes loaded in a specific security bag 100 is limited by its size, so that it can be deployed with an extra portion folded over.

[0025] In an exemplary embodiment of the invention, the extra portion of each bag is folded (620) over (first face 110 toward first face 110) to form an ink collection base at the bottom of the bag when deployed in the ink box 210. optionally the ink collection base has perforations 150 in it so that the ink will seep into the bag.

[0026] In some embodiments of the invention, a larger over-pack security bag 510 is used (630) to group multiple security bags 100 together when placing them in ink

box 210. Optionally, security bags 100 are positioned (650) side by side as described above inside over-pack security bag 510. Alternatively, the security bags may be positioned (640) next to each other directly in ink box 210 without being grouped together in a larger bag.

[0027] If over-pack security bag 510 is used then the second face 540, of the over-pack security bag 510, with the mesh material is positioned upward, so that the ink drops 230 will be free to enter the over-pack security bag 510. Optionally, the first face 530, of security bag 510, with the standard material also has perforation holes to allow ink 220 from the floor of ink box 210 to enter the security bag.

[0028] In some embodiments of the invention, ink box 210 is designed so that it can only be opened from the top and only when positioned upward so that it cannot be positioned to hinder the inking process. Optionally the top may include a lock release mechanism to enable opening the box from the side only if the top is facing upward. Alternatively or additionally, the inking process may be based on high speed ejection of the ink to minimize the dependence on gravity.

[0029] Fig. 7 is an alternative arrangement of security bags inside in an ink box, according to an exemplary embodiment of the invention. Optionally, security bags 100 may be arranged with the second face 140 (mesh material) facing a second face 140 and a first face 110 (standard material) facing a first face 110, in contrast to having a first face 110 facing a second face 140 as explained above and illustrated in Fig. 2 and Fig. 5.

[0030] It should be appreciated that the above described methods and apparatus may be varied in many ways, including omitting or adding steps, changing the order of steps and the type of devices used. It should be appreciated that different features may be combined in different ways. In particular, not all the features shown above in a particular embodiment are necessary in every embodiment of the invention. Further combinations of the above features are also considered to be within the scope of some embodiments of the invention.

[0031] It will be appreciated by persons skilled in the art that the present invention is not limited to what has been particularly shown and described hereinabove. Rather the scope of the present invention is defined only by the claims, which follow.

Claims

1. A method of secure transfer of banknotes, comprising:

loading banknotes into one or more security bags with a tamper proof seal;
wherein said security bags have a first face including the seal and made from standard bag material, and a second face made from a mesh material that allows liquid to enter the bag; wherein the width of the bags is wider than the width of the banknotes such that when the banknotes are positioned near one side of the bag an extra portion is left over;
folding over the extra portion of the security bag so that the first face of the bag is facing the first face of the extra portion to form an ink collection base; wherein the first face has perforations at least in the area of the ink collection base;
positioning the security bags in an ink box that includes an inking system that ejects ink from its top to its bottom if security of the ink box is breached; wherein the ink collection base is placed on the bottom of the box and the security bags extend upward toward the top of the box;
closing the box; and
arming the inking system of the box.

2. A method according to claim 1, further comprising:

positioning the security bags in a larger over-pack security bag instead of directly in the ink box and placing the over-pack security bag in the ink box; wherein the side of the over-pack security bag facing upward is made of mesh material and the side facing toward the bottom of the box is made from standard bag material.

2. A method according to claim 2, wherein the side facing the bottom of the box includes perforations like the smaller security bags.

3. A method according to claim 1, wherein the security bags are aligned in the ink box to be positioned such that the first face of one bag is facing the second face of the bag next to it.

4. A method according to claim 1, wherein the security bags are aligned in the ink box to be positioned such that the first face of one bag is facing the first face of the bag next to it and the second face of the bag is facing the second face of the bag next to it.

5. A method according to claim 1, wherein the perforations on the first face of the security bag form a matrix of perforations.

6. A method according to claim 1, wherein the perforations on the first face of the security bag are spread out randomly.

7. A secure banknote transfer assembly comprising a security bag, the security bag having a first face made of standard bag material and having a tamper proof seal on the first face and a second face made from a mesh material that allows liquid to enter the bag, the bag receiving a plurality of banknotes in a stack, the bag being wider than the width of the ban-

knotes received therein so as to define an extra portion of the bag, the extra portion being folded onto the rest of the bag about a fold so that the first face of the extra portion faces the first face of the rest of the bag, whereby the fold forms an ink collection base, the first face being perforated at least in the area of the ink collection base, the security bag being arranged in a closed ink box that includes an armed inking system which ejects ink from its top to its bottom if security of the ink box is breached, the bag being arranged in the ink box such that the ink collection base is on the bottom of the ink box and the rest of the bag extends upwards toward the top of the box.

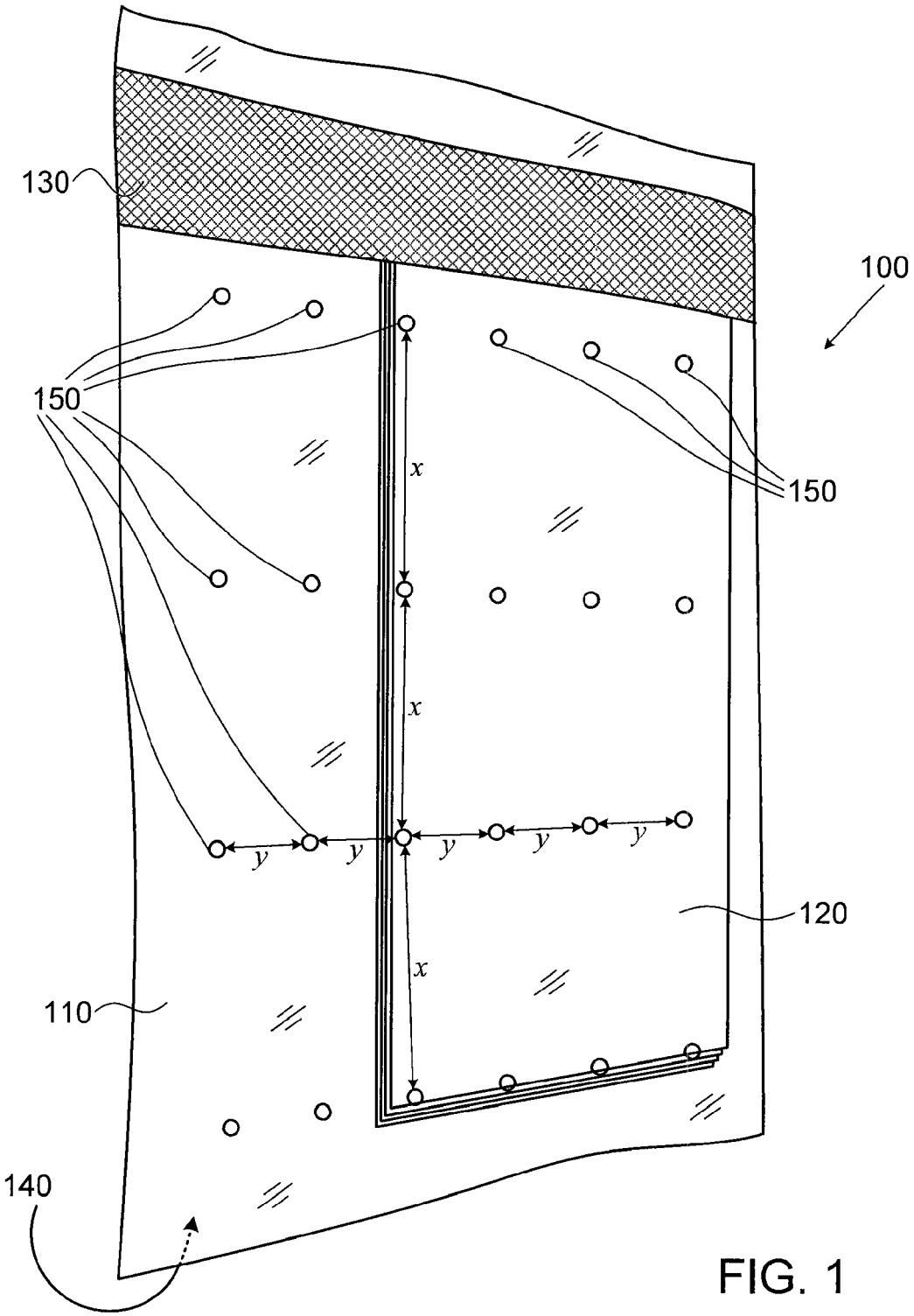

FIG. 1

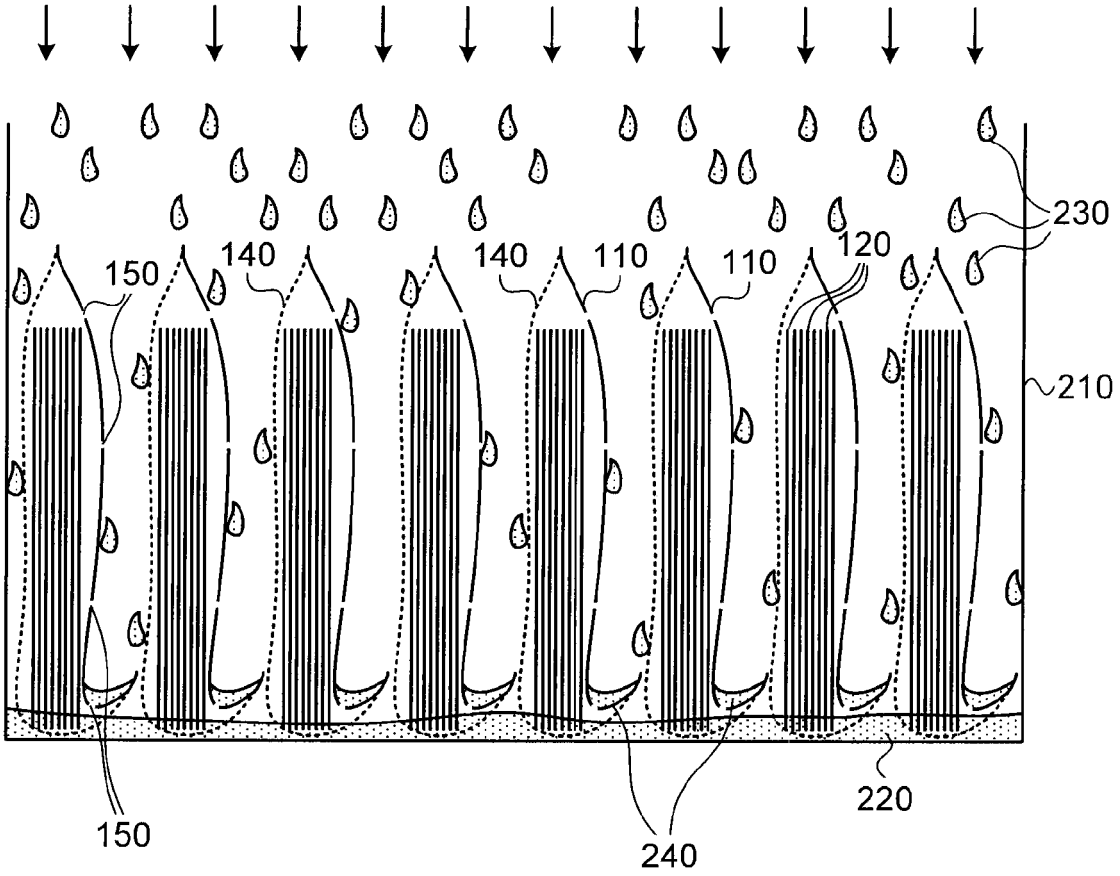

FIG. 2

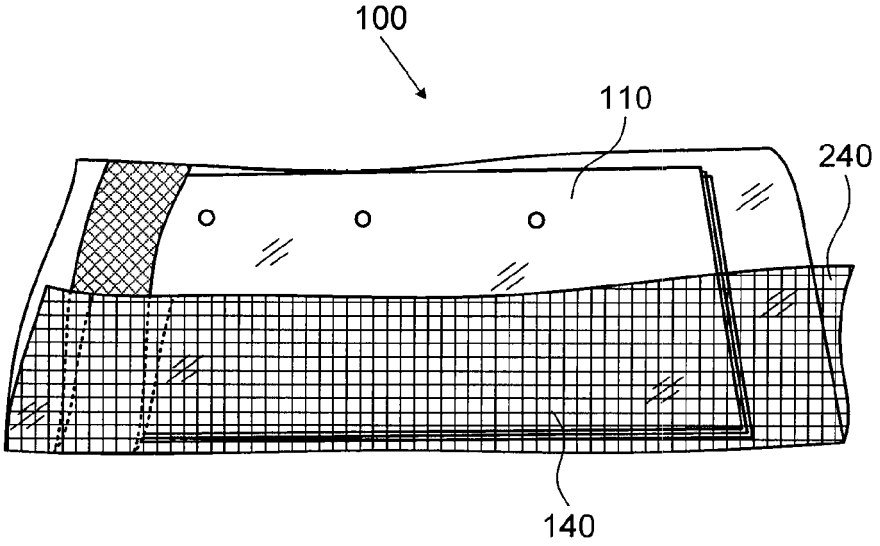

FIG. 3

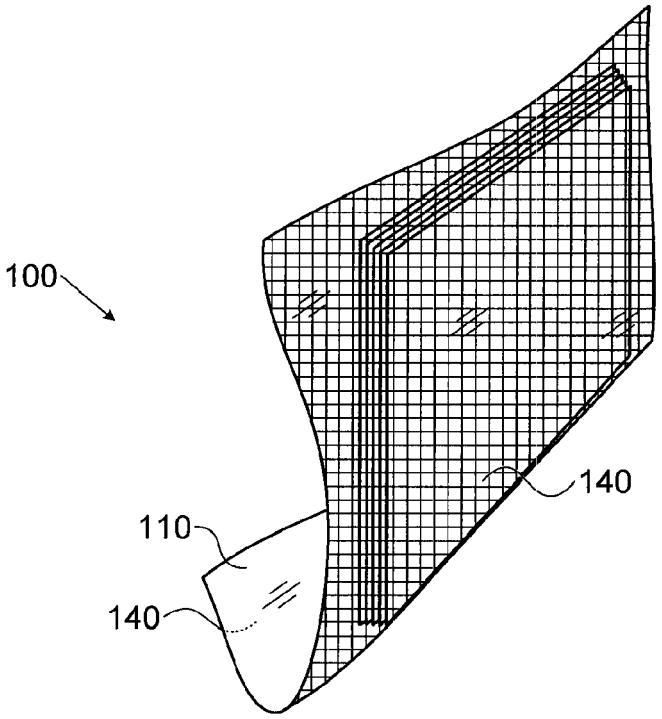

FIG. 4

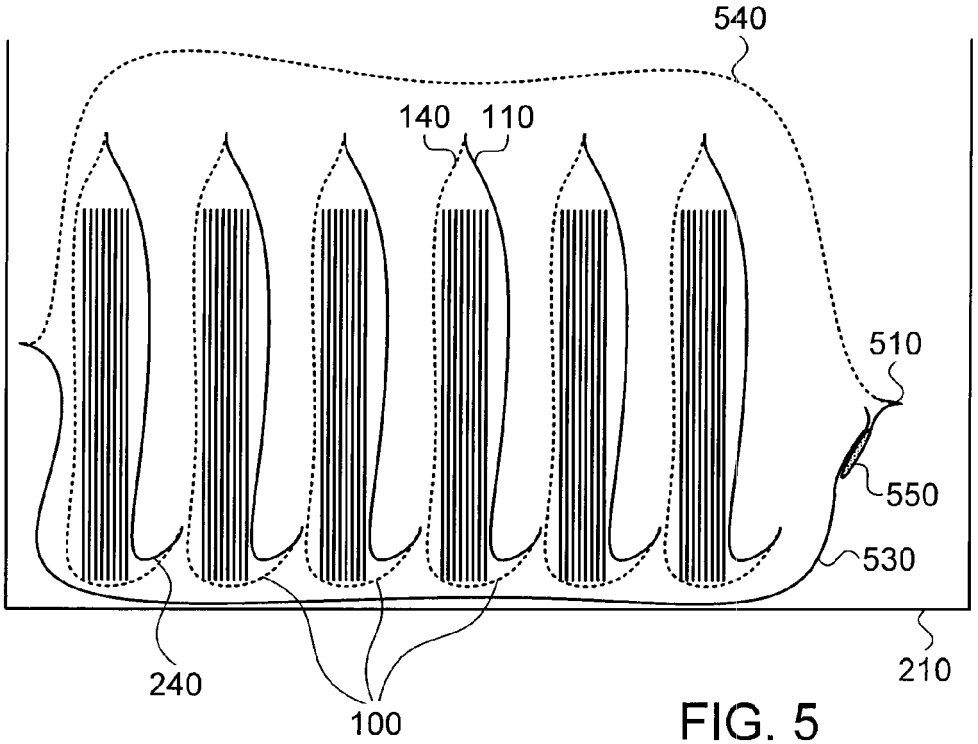
540
140
110
510
550
530
240
100
210

FIG. 5

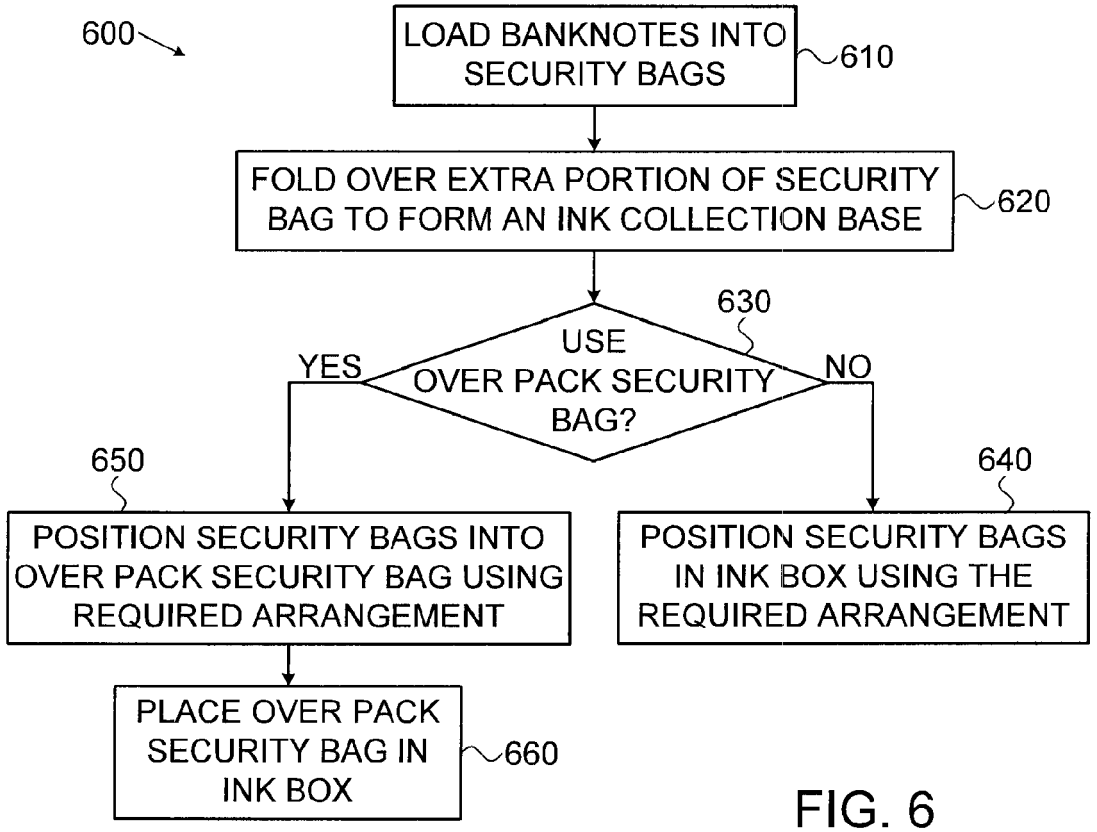
600
LOAD BANKNOTES INTO SECURITY BAGS
610
FOLD OVER EXTRA PORTION OF SECURITY BAG TO FORM AN INK COLLECTION BASE
620
630
USE OVER PACK SECURITY BAG?
YES
NO
650
640
POSITION SECURITY BAGS INTO OVER PACK SECURITY BAG USING REQUIRED ARRANGEMENT
POSITION SECURITY BAGS IN INK BOX USING THE REQUIRED ARRANGEMENT
PLACE OVER PACK SECURITY BAG IN INK BOX
660

FIG. 6

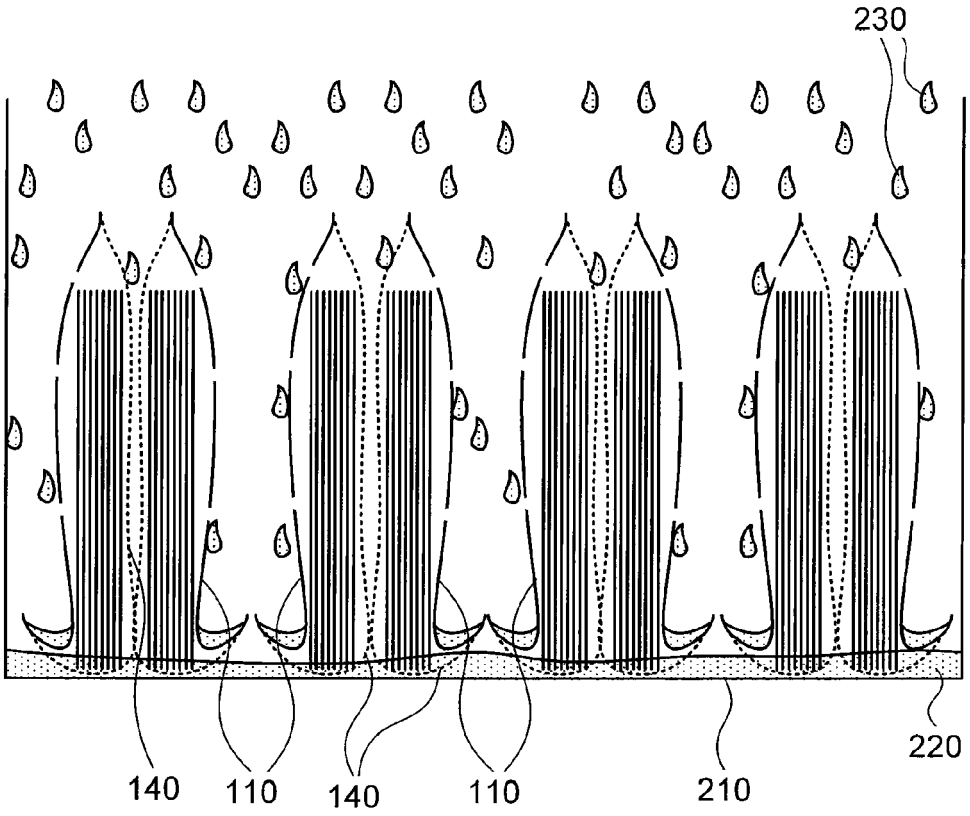

FIG. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 11 16 1208

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A	EP 1 878 672 A1 (DECOMATIC SA [FR]) 16 January 2008 (2008-01-16) * paragraphs [0003] - [0008] * * paragraphs [0017] - [0022] * * figures 1-3 *	1,7	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	21 December 2011	Espuela, Vicente

CATEGORY OF CITED DOCUMENTS

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L : document cited for other reasons

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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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