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Description

[0001] The present invention relates to an improved system for handling a sheaf of notes, particularly bank notes or the like.

[0002] GB-A-2,305,901 describes a money handling system in which a tube conveyor system is used to convey money between one location and a remote storage location. The money is conveyed in a carrier, which is placed (usually manually) into a sending station, and received at a receiving station situated at or close to the storage location, where the carrier is opened and the money extracted (again usually manually).

[0003] EP-A-0841644 describes a cash handling system in which parcels of bank notes are delivered to a collection location, such as an ATM machine. The system described is illustrated in Figures 1 and 2, and employs a "pick and place" mechanism 15 whereby a parcel of cash 21 is extracted from a storage unit 11 and delivered to the collection point 22. The "pick and place mechanism" 15 includes a carriage 17 that moves along a rail 16 or track, with an arm 18 that carries a jaw assembly 19. The jaws of the jaw assembly 19 can be opened or closed so as to grip or release a parcel. Thus, when there is a demand for cash to be delivered to the collection point 22, the carriage 17 is moved along the rail 16 until the jaw assembly 19 is aligned with a parcel 21 in the storage unit 11. The jaws are activated to grip the parcel, and the carriage 17 is then moved along the rail 16 to the collection point 22, where the jaws are opened to release the parcel.

[0004] The system also includes a conveyor arrangement for replenishing parcels in the storage unit 11. This is illustrated in Figure 2. Within a vault or secure cash room 24 a conventional bank note counting and dispensing mechanism 25 compiles parcels of bank notes of predetermined value, and supplies them to the jaw assembly of a pick and place mechanism 26. The mechanism 26 then transports parcels individually from the dispensing mechanism 25 and inserts them into the sending station 28 of a pneumatic tube conveyor system 27. The conveying tube of the system 27 terminates at its opposite end in a receiving station 29 adjacent the storage unit 11 and accessible to the jaw assembly 19 of the pick and place mechanism 15. The mechanism 26 passes the parcel to the station 28 where it is introduced into a carrier and the carrier is dispatched along the tube system to the receiving station 29. Within the receiving station 29 the parcel is either removed from the carrier and presented for access by the jaw assembly 19, or alternatively the carrier itself is opened to provide access for the jaw assembly 19 to the parcel. Thereafter the mechanism 15 retrieves the parcel from the station 29 and introduces it into the storage unit 11.

[0005] These prior art cash handling systems rely on established designs of carriers for the pneumatic conveying. When the carrier arrives at its destination receiving station the parcel of notes has to be removed from

the carrier (possibly involving opening of the carrier). Established carrier designs usually include a canister that can be closed and opened by unscrewing or releasing a closure device. It is clearly undesirable, especially when providing cash to re-stock an ATM machine, for this operation to be performed manually. Automation of the process may involve a complex series of operations to ensure that the parcel of notes is correctly picked out of the carrier and delivered to its storage location.

[0006] US 5,101,979 discloses an apparatus in which paper sheets are stored in a cash box and conveyed to/from the cash box by a holding means. The holding means includes upper and lower fingers that hold the sheets and are used to insert sheets into and extract sheets from sheet accommodating portions of the cash box.

[0007] EP 1001387 discloses a system for transporting valuable objects that includes a pneumatic tube conveyor and a carrier having disc-shaped end pieces with a gripper with jaws that hold the objects during transportation. One end piece has an opening and to remove the object from the carrier the other end piece is pushed towards it. As the objects emerge from the opening the gripper jaws move apart to release them.

[0008] The present invention has been conceived with the foregoing in mind.

[0009] According to a first aspect of the present invention there is provided a system for transporting a sheaf of notes from a storage location to a dispensing outlet, as defined in claim 1.

[0010] Embodiments of the system comprise a conveyor apparatus, a carrier within which the sheaf is transported through the conveyor apparatus, and an extractor for removing the sheaf from the carrier. The carrier comprises a resiliently biased gripper for gripping the sheaf with a first gripping force. The extractor comprises an extraction gripping device configured to grip the sheaf with a second gripping force, which is greater than the first gripping force.

[0011] The conveyor apparatus comprises a pneumatic conveyor, a pneumatic tube conveyor.

[0012] It is an advantage of the present invention that, because the resilient gripper grips the sheaf with a force that is less than the force of the extractor, then the extractor can remove the sheaf from the carrier without the need to activate any mechanism in the carrier itself. This means that the carrier does not have to be provided with any activation means, power supply or control signaling. Another advantage is that the sheaf is held in position in the carrier by the gripper, rather than being loosely deposited inside the carrier. This means that when the carrier is positioned at a location where the sheaf is to be extracted, the extractor will find the sheaf in correct alignment for extraction.

[0013] The gripper comprises a pair of opposing gripping surfaces biased towards each other. The gripping surfaces may be surfaces of a pair of plates. The plates may be shaped to provide a mouth for insertion of a sheaf

between the plates. The plates may also be shaped to provide an ungripped portion of the sheaf in the carrier, the extractor being configured to grip the sheaf at the ungripped portion to remove the sheaf from the carrier.

[0014] In embodiments of the invention, the system further comprises a depositing mechanism for inserting a sheaf of notes into the carrier. The depositing mechanism may be configured to prize open the gripper and insert the sheaf into the carrier. The depositing mechanism may comprise a shaped member whereby insertion of the shaped member between the gripping surfaces prizes them apart to open the gripper.

[0015] Embodiments comprise a carrier for transporting a sheaf of notes through a conveyor. The carrier comprises a gripper having a pair of substantially parallel gripper plates moveable towards one another for gripping the sheaf. A biasing arrangement is configured to bias the gripper plates towards one another with a predetermined gripping force.

[0016] The gripper plates are shaped so that a portion of the sheaf is not gripped between the plates thereby permitting extraction of the sheaf by an extractor gripping the sheaf at that portion with a force that is greater than the predetermined gripping force.

[0017] The plates are shaped to receive the sheaf from an insertion direction substantially parallel to the gripping surfaces of the plates. Preferably, the plates having diverging opposing surfaces along an edge facing the insertion direction.

[0018] Embodiments of the second aspect provide an insertion device for inserting a sheaf of notes into a carrier. The carrier comprises a pair of gripper plates biased towards one another for gripping the sheaf of notes. The insertion device comprises: a gripper for holding the sheaf; and a plate separator comprising one or more members extending beyond the gripper in a direction in which the sheaf of notes is inserted into the carrier. Each member has a tapered form for separating the carrier gripper plates when the member is inserted there between.

[0019] In embodiments of the invention the gripper holds the sheaf with a gripping force that is smaller than the gripping force of the carrier gripper plates. Preferably, the insertion device comprises a pair of members having tapered forms for insertion between the carrier gripper plates.

[0020] In embodiments of the third aspect there is provided a system for processing notes, such as bank notes. The system comprises: a carrier comprising a gripper for gripping a sheaf of notes; a conveyor apparatus for conveying the carrier; and a processing station for receiving the carrier. The processing station comprises: an extractor for extracting the sheaf of notes from the carrier and inserting the notes into a note processor. The note processor comprises one or more of: a note counter, a note validator and a note recycler. A controller controls operation of the system.

[0021] The controller may comprise a computer pro-

grammed with software for controlling operation of the system.

[0022] The system may be in a location remote from a central processor, and the computer may include a link and/or data output for communication with the central processor. The processing station may be enclosed within a housing constructed in accordance with ATM and/or safe grading standards, for example constructed of concrete and/or steel. Part, or all of the controller may be contained within the housing.

[0023] Embodiments of the invention will now be described with reference to the accompanying drawings.

Figure 1 is a diagrammatic illustration of a prior art cash storage unit and a pick and place mechanism. Figure 2 is a diagrammatic illustration of a system for replenishing a cash storage unit of the type shown in Figure 1.

Figure 3 is a partially cut-away illustration of a carrier in accordance with aspects of the present invention. Figure 4 illustrates a plate of a gripper forming part of the carrier of Figure 3.

Figure 5 illustrates a biasing arrangement for a gripper forming part of the carrier of Figure 3.

Figures 6a and 6b illustrate end views of each end of the carrier of Figure 3.

Figure 7 illustrates a side wall for the carrier of Figure 3.

Figure 8 illustrates part of an insertion device for inserting a sheaf of notes into the carrier of Figures 3 to 7.

Figure 9 illustrates part of an alternative arrangement of a carrier in accordance with the present invention.

Figure 10 illustrates a bank note processing system in accordance with an aspect of the invention.

Figure 11 is a schematic block diagram illustrating the functionality and control of the bank note processing system of Figure 10.

[0024] Referring to Figure 3, a carrier 30 of the type suitable for use in a pneumatic tube conveying system, includes a disc-shaped end-piece 32 having an inner circular face 33, and an outer circular face 34. The end-piece 32 is disposed at one end of the carrier, while another similar end piece is disposed at the opposite end, but is not shown in Figure 3 for clarity.

[0025] A gripper arrangement 35 is held in place between the end pieces and includes an upper gripper plate 36 and a lower gripper plate 37. The gripper plates 36, 37 are each preferably formed from a suitable metal sheet by a pressing or stamping operation. The gripper plates 36, 37 are disposed one above the other to form a pair of gripping surfaces between which a sheaf of bank notes can be gripped. Figure 4 shows the upper gripper plate 36 in isolation, using the same reference numerals as used in Figure 3. As shown in Figure 3, each of the gripper plates 36, 37, is bent to turn away from the other plate towards a longitudinal edge 38a, 38b of the respective

plate 36, 37 so as to present a mouth that leads into a gap 39 between the plates. The purpose of this mouth will be described in more detail below. Each of the gripper plates also includes a rectangular cut-out 40a, 40b, which is open to the respective longitudinal edge 38a, 38b. The purpose of these cut-outs will be described in more detail below.

[0026] Each of the gripper plates 36, 37 also includes two pairs of longitudinally aligned holes 41a, 41b and 41c, 41d, disposed such that each of the holes 41a-d in the upper plate 36 is aligned with the corresponding hole 41a-d in the lower plate. Each of the gripper plates 36, 37 also includes two pairs of U-shaped cut-outs 42a, 42b and 42c, 42d, one cut-out of each pair at each end of each plate. Each pair of cut-outs 42a, 42b and 42c, 42d is longitudinally aligned with a respective pair of holes 41a, 41b and 41c, 41d.

[0027] Referring to Figure 5, a biasing arrangement 44 comprises a frame 45 made up of an upper longitudinal square section member 46, a lower longitudinal square section member 47 and end members 48a, 48b. At each corner of the frame is a corner block 49a-d connecting a longitudinal square section member and an end member. The corner blocks each have an end face with a threaded hole 50. Extending inwardly of the frame 45 from each of the upper and lower longitudinal square section members 46, 47, are a pair of posts 51a,b and 51c,d. Each pair of posts 51a,b and 51c,d is positioned to align with a corresponding pair of holes 41 a,b and 41c,d in the gripper plates. Each of the posts 51 a-d has a diameter slightly smaller than the corresponding hole 41a-d, so that the posts can pass through the holes without interference. Around each of the posts 51 a-d is an associated helical spring 52a-d. The diameter of each helical spring 52a-d is larger than that of the corresponding hole 41 a-d.

[0028] Referring again to Figure 3, the gripper arrangement 35 is assembled such that the gripper plates 36, 37 are supported between two parallel biasing arrangements 44a,b (although, for clarity, only part of the front biasing arrangement 44b is shown). The helical springs 41a-d exert a biasing force on the gripper plates 36, 37 tending to push them towards each other. The gripper plates 36, 37 are constrained by the end members 48a,b which are disposed to extend through the U-shaped cut-outs 42a-d. The cut-outs 42a-d thereby act as guides so that the gripper plates 36, 37 can only move towards or away from each other with, or against, the biasing action of the helical springs 52a-d. The biasing arrangements 44a,b are fastened to the end pieces 32 by means of screws (not shown) that pass through holes 53 in the end piece 32.

[0029] Referring to Figures 6a, and 6b, the end pieces 32a, 32b which form the end of the carrier 30 of Figure 3, each include an inner circular face 33a,b and an outer circular face 34a,b and are formed from a suitable rigid metal or plastics material. Each of the end pieces 32a, 32b has four holes 54a, 54b through which screws (not shown) pass to fasten the biasing arrangements 44a,b

as described above. Each end piece 32a, 32b also has a pair of slots 55a,b and 55c,d located close to the circumference and spaced apart by about 90 degrees. Each end piece 32a, 32b also has a cut-out 56a,b formed in the respective outer circular face 34a, 34b at a position on the circumference of the disc. When the carrier is positioned in a sending station 28 or receiving station 29, as shown in Figure 2, the cut-outs 56a,b can be engaged by a rotation mechanism to rotate the carrier on its axis so that the gripper mechanism is correctly aligned to receive or dispense a sheaf of notes. Wrapped around the outside of each of the end pieces 32a,b is a material 57 that is provided to assist in the aerodynamics of the carrier. The material may have a roughened surface and may, for example, be of a hook-and-loop fastener material such as VelcroTM.

[0030] Referring to Figure 7, an outer wall 58 of the carrier is formed of a sheet material, such as a metal or plastics sheet. The outer wall has a part-cylindrical curve and pairs of tongues 59a,b and 59c,d extending longitudinally (i.e. axially). These tongues engage in respective ones of the slots 55a-d in the end pieces. Note that the wall 58 extends only around a rear portion of the circumference of the cylindrical carrier 30. The front of the carrier 30, through which a sheaf of notes is inserted and extracted, remains open to the side.

[0031] Referring to Figure 8, a depositing arrangement includes a device 60 that places a sheaf of notes into the carrier 30. The device 60 operates in a similar manner to the pick and place mechanism 26 of Figure 2, and the principal features shown in Figure 8 include a pair of gripper plates 61 (of which only one is shown) located one above the other so as to grip a sheaf of notes between them. The gripper plates 61 are slightly smaller than the rectangular cut-outs 40a, 40b in the gripper plates 36, 37 of the carrier. The gripper plates 61 are spring-loaded off a frame (not shown) to provide a gripping force, in a similar manner to, but with a smaller gripping force than, the gripper plates 36, 37 of the carrier. A stop member 62 extends perpendicular to the gripper plates 61 through slots 63. In addition, the depositing arrangement includes a pair of arms 64a, 64b that extend in a direction towards the carrier. The arms 64a, 64b are positioned so that when a sheaf of notes is held between the gripper plates 61, the sheaf will be located between (i.e. embraced by) the arms 64a, 64b. Each of the arms 64a, 64b has a tapered end portion 65a, 65b.

[0032] In use, an empty carrier 30 is delivered by the pneumatic conveyor system to a loading station, which is located in the position of the sending station 28 of Figure 2. A sheaf of notes is collected by the device 60 of the depositing arrangement so that the sheaf is gripped between the plates 61. The sheaf is deposited into the carrier 30 by advancing the device 60 towards the carrier, which is aligned (as described above using the cut-outs 56a, 56b) so that the sheaf will enter into the mouth that is formed between the front edges 38a,b of the upper and lower gripper plates 36, 37. As the sheaf of notes is

offered up to the carrier 30, the gripper plates 36, 37 are compressed together by the biasing action of the helical springs 52a-d. In order to open the gripper 35, the tapered end portions 65a, 65b of the arms 64a, 64b enter the mouth that is formed between the front edges 38a,b of the upper and lower gripper plates 36, 37 as the device 60 is moved towards the carrier 30. The tapered shape of the arms pushes the plates 36, 37 apart against the biasing action of the springs 52a-d. By the time the sheaf of notes reaches the mouth, the gripper plates 36, 37 have been urged apart and the sheaf can be pushed all the way into the gap 39. The stop member 62 ensures that the sheaf is pushed all the way into the carrier 30. When the depositing device is withdrawn, the biasing action of the helical springs 52a-d urges the gripper plates 36, 37 towards each other so that they grip the sheaf.

[0033] The carrier with a sheaf of notes securely gripped between the gripper plates 36, 37, is then conveyed to a receiving location, for example adjacent a storage unit such as the storage unit 11 of Figure 1. The sheaf of notes is now extracted from the carrier using an extractor mechanism. In principle this is similar to the "pick and place" device of Figure 1. However, in the system of this invention, the carrier is brought to rest at the receiving station and is orientated so that the mouth of the gripper plates is aligned with extractor (as described above using the cut-outs 56a, 56b). The extractor has essentially the same form as the device 60 of the depositing arrangement without the arms 64a,b. That is to say, the extractor has jaws that grip the sheaf and is positioned so that the jaws come together to contact the top and bottom of the sheaf at the rectangular cut-outs 40a,b in the upper and lower gripper plates 36, 37. Moreover, the jaws of the extractor are brought together with a mechanism that applies a force that is greater than the biasing force of the helical springs 52a-d of the gripper 35. Thus, when the extractor moves away from the carrier the sheaf of notes is pulled out of the gripper 35.

[0034] It will be appreciated by one of skill in the art, that the precise arrangement of the gripper mechanism may be varied without altering the principles of the invention. For example, as shown in Figure 9 (where equivalent features are referred to with the same reference numerals) the frames 44a, 44b of the carrier of Figure 3 are replaced with upper blocks 70 (only one of which is shown) located above and generally parallel to the upper gripper plate 36, and corresponding lower blocks (not shown) underneath the lower gripper plate 37. The blocks 70 are interconnected with horizontal (as shown) threaded rods 71 screwed into threaded receiving holes 72. Vertical threaded rods 73 extend between each upper block 70 and the corresponding lower block, passing through aligned holes 74 in the gripper plates 36, 37. The vertical threaded rods 73 pass axially through helical compression springs 74. Finally, the end pieces 32 each have a guide block 75 on the inner circular face 33, which aligns with cut-outs 76 in the gripper plates 36, 37 and replace the cut-outs 42a-d and vertical frame end mem-

bers 48a,b of the arrangement shown in Figure 3.

[0035] Referring to Figure 10, a system for processing notes, such as bank notes, includes a conveyor apparatus 102. Conveyor apparatus 102 is preferably a pneumatic tube conveyor, of a type described above. The conveyor apparatus 102 conveys a carrier 104, which is of a type as described above and depicted in Figures 3-7. The carrier 104 has a gripper 106 for gripping a sheaf of notes, for example bank notes (not shown). The carrier 104 is shown positioned at a carrier receiving station 108, which is part of a processing station 110.

[0036] When the carrier 104 is received at the carrier receiving station 108 it is positioned so that the gripper 106 is aligned with an extractor 112 for extracting the sheaf of notes from the carrier 104. As described above in relation to Figures 3 to 7, the gripper 106 in the carrier 104 is resiliently biased for gripping the sheaf with a first gripping force. The extractor 112 also includes a gripper, which grips the sheaf with a second gripping force, greater than the first gripping force, in order to extract the sheaf from the carrier 104. The extractor 112 is part of a "pick and place mechanism" (similar to that described above in relation to Figures 1 and 2) and is carried on an arm 114 that is moved along a rail 116 or track.

[0037] The carrier receiving station 108 is positioned adjacent to (above in the embodiment shown), a note processor 118. The note processor includes a note receiver 120, with a slot 122 into which the notes are inserted by the extractor 112 after they have been extracted from the carrier 104. The note processor may include one or more of a variety of automated note processing operations such as a note counter, a note validator or a note recycler. After processing the notes are stored in the processing station 110 until they are either recycled, or collected/emptied.

[0038] The operation of the processing station is controlled by a controller 124. The controller 124 is implemented in a computer programmed with software for controlling operation of the system. The controller 124 is shown located outside the processing station 110, with a data communications link 126 between them. However, part or all of the controller 124 may be housed inside the processing station 110.

[0039] The processor 124 computer includes a link and/or data output 128 for communication with a central processor, which, for example, could be a central accounting computer of a bank. The system thus has the ability to provide management and audit information based on the notes that have been processed, either locally or to a central processing point (such as a bank's central accounting computer).

[0040] As shown by the chain-dotted lines in Figure 10, the processing station 110 is enclosed within a housing 130. The housing 130 is preferably constructed in accordance with ATM and/or safe grading standards, and for example may be constructed of concrete and/or steel.

[0041] Figure 11 is a schematic block diagram illustrating the functionality and control of the bank note process-

ing system of Figure 10, and shows in more detail exemplary components that go to make up the controller 124. As shown in Figure 11, the system includes: the pneumatic conveyor tube 102, through which carriers are delivered to and dispatched from the tube station 108; a pick and place mechanism 132 (including, for example, extractor 112 carried on arm 114 movable along rail 116 as described above and shown in Figure 10); and the note processor 118. Notes are transferred between the tube station 108 and the note processor 118 by means of the pick and place mechanism 132. The controller 124 includes a local tube station micro-controller unit 134, which controls the operation of the tube station 108 under instructions from a pneumatic tube system controller 136, which also controls operation of other parts of the pneumatic tube conveyor system, including a sending station 150. A second local micro-controller unit 138 controls operation of the pick and place mechanism 132 and the note processor 118, under instructions from a computer 140 (such as a p.c.). Control and data communications are provided by way of suitable cable or wireless means between the various control and hardware components. As shown this may also include data provided from an ATM 152 (automated teller machine) to/from which bank notes are supplied by way of the pneumatic tube system.

Claims

1. A system for transporting a sheaf of notes from a storage location to a dispensing outlet, the system comprising:

a pneumatic tube conveyor apparatus (27);
a carrier (30) having a disc-shaped end piece at each end and a gripper arrangement held in place between the end-pieces, the gripper arrangement comprising:

a gripper (35) having a pair of substantially parallel gripper plates (36, 37) moveable towards one another for gripping the sheaf between the plates, and

a biasing arrangement (44) configured to bias the gripper plates towards one another with a predetermined gripping force, wherein the gripper plates (36, 37) are shaped to include an ungripped portion (40a, 40b) of the sheaf between the plates in the carrier; and

an extractor (112) for removing the sheaf from the carrier, wherein the extractor comprises an extraction gripping device configured to grip the sheaf by contacting the top and bottom of the sheaf at said ungripped portion (40a, 40b) with a second gripping force, which is greater than the predetermined gripping force biasing the gripping

plates (36, 37) in the carrier.

2. The system of claim 1 wherein the plates (36, 37) are shaped to receive the sheaf from an insertion direction substantially parallel to the gripping surfaces of the plates.
3. The system of claim 2 wherein the plates (36, 37) are shaped to provide a mouth for insertion of a sheaf between the plates.
4. The system of any preceding claim wherein the carrier has a part-cylindrical outer wall that extends around a rear portion of the carrier and an open front portion for insertion and extraction of the sheaf.
5. The system of any preceding claim further comprising a depositing mechanism for inserting a sheaf of notes into the carrier (30).
6. The system according to claim 5 wherein the depositing mechanism is configured to prize open the gripper and insert the sheaf into the carrier.
7. A system according to any preceding claim, the system further comprising:

a processing station (110) receiving said carrier, wherein the processing station comprises:

said extractor (112) and a note processor (118), wherein said extractor is further configured to insert the notes into the note processor, wherein the note processor comprises one or more of: a note counter, a note validator and a note recycler; and a controller (124) controlling operation of the system.

8. The system of claim 7, wherein the controller (124) comprises a computer programmed with software for controlling the operation of the system.
9. The system of claim 7 or claim 8 wherein the processing station (110) and part or all of the controller (124) is enclosed within a housing (130) constructed in accordance with ATM and/or safe grading standards.

Patentansprüche

1. System zum Transportieren eines Banknotenbündels von einem Speicherort zu einem Ausgabeschlitz, wobei das System umfasst:

eine pneumatische Rohrfördervorrichtung (27);
ein Träger (30) mit einem scheibenförmigen Endstück an jedem Ende und einer Greiferan-

ordnung, die zwischen den Endstücken an ihrem Platz gehalten wird, wobei die Greiferanordnung umfasst:

einen Greifer (35) mit einem Paar von im Wesentlichen parallelen Greiferplatten (36, 37), die zum Ergreifen des Bündels zwischen den Platten gegeneinander bewegbar sind, und
 eine Spannvorrichtung (44), die dafür konfiguriert ist, die Greiferplatten mit einer vorbestimmten Greifkraft gegeneinander zu spannen,
 worin die Greiferplatten (36, 37) dafür geformt sind, einen nicht ergriffenen Abschnitt (40a, 40b) des Bündels zwischen den Platten im Träger einzuschließen; und
 einen Herausnehmer (112) zum Entnehmen des Bündels aus dem Träger, worin der Herausnehmer eine Herausnahmegreifvorrichtung umfasst, die dafür konfiguriert ist, das Bündel durch Berühren des oberen und unteren Randes des Bündels an dem nicht ergriffenen Abschnitt (40a, 40b) mit einer zweiten Greifkraft zu ergreifen, die größer als die vorbestimmte Greifkraft ist, welche die Greiferplatten (36, 37) im Träger spannt.

2. System nach Anspruch 1, worin die Platten (36, 37) dafür geformt sind, das Bündel aus einer Einsetzrichtung, die im Wesentlichen parallel zu den Greifflächen der Platten ist, aufzunehmen.
3. System nach Anspruch 2, worin die Platten (36, 37) dafür geformt sind, eine Mündung zum Einsetzen eines Bündels zwischen die Platten bereitzustellen.
4. System nach einem der vorhergehenden Ansprüche, worin der Träger eine teilzylinderförmige Außenwand hat, die sich um einen Hinterabschnitt des Trägers und einen offenen Vorderabschnitt zum Einsetzen und Herausnehmen des Bündels erstreckt.
5. System nach einem der vorhergehenden Ansprüche, ferner einen Ablagemechanismus zum Einsetzen eines Banknotenbündels in den Träger (30) umfassend.
6. System nach Anspruch 5, worin der Ablagemechanismus dafür konfiguriert ist, den Greifer aufzudrücken und das Bündel in den Träger einzusetzen.
7. System nach einem der vorhergehenden Ansprüche, wobei das System ferner umfasst:

eine Verarbeitungsstation (110), die den Träger aufnimmt, worin die Verarbeitungsstation um-

fasst:

den Herausnehmer (112) und eine Banknotenverarbeitungseinrichtung (118), wobei der Herausnehmer ferner dafür konfiguriert ist, die Banknoten in die Banknotenverarbeitungseinrichtung einzusetzen, worin die Banknotenverarbeitungseinrichtung eines oder mehr von Folgendem umfasst: einen Banknotenzähler, einen Banknotenprüfer und einen Banknotenrückführer; und eine Steuerungseinrichtung (124), die den Betrieb des Systems steuert.

8. System nach Anspruch 7, worin die Steuerungseinrichtung (124) einen Computer umfasst, der mit Software zum Steuern des Betriebs des Systems programmiert ist.
9. System nach Anspruch 7 oder Anspruch 8, worin die Verarbeitungsstation (110) und ein Teil oder das Ganze der Steuerungseinrichtung (124) in ein Gehäuse (130) eingeschlossen sind, das gemäß Geldautomaten- und/oder sicheren Sortierstandards aufgebaut ist.

Revendications

1. Système permettant de transporter une liasse de billets depuis un emplacement de stockage vers un point de distribution, le système comprenant :

un appareil de convoyage par tube pneumatique (27) ;

un dispositif porteur (30) présentant une pièce d'extrémité en forme de disque au niveau de chaque extrémité et un agencement formant pince maintenu en place entre lesdites pièces d'extrémité, l'agencement formant pince comprenant :

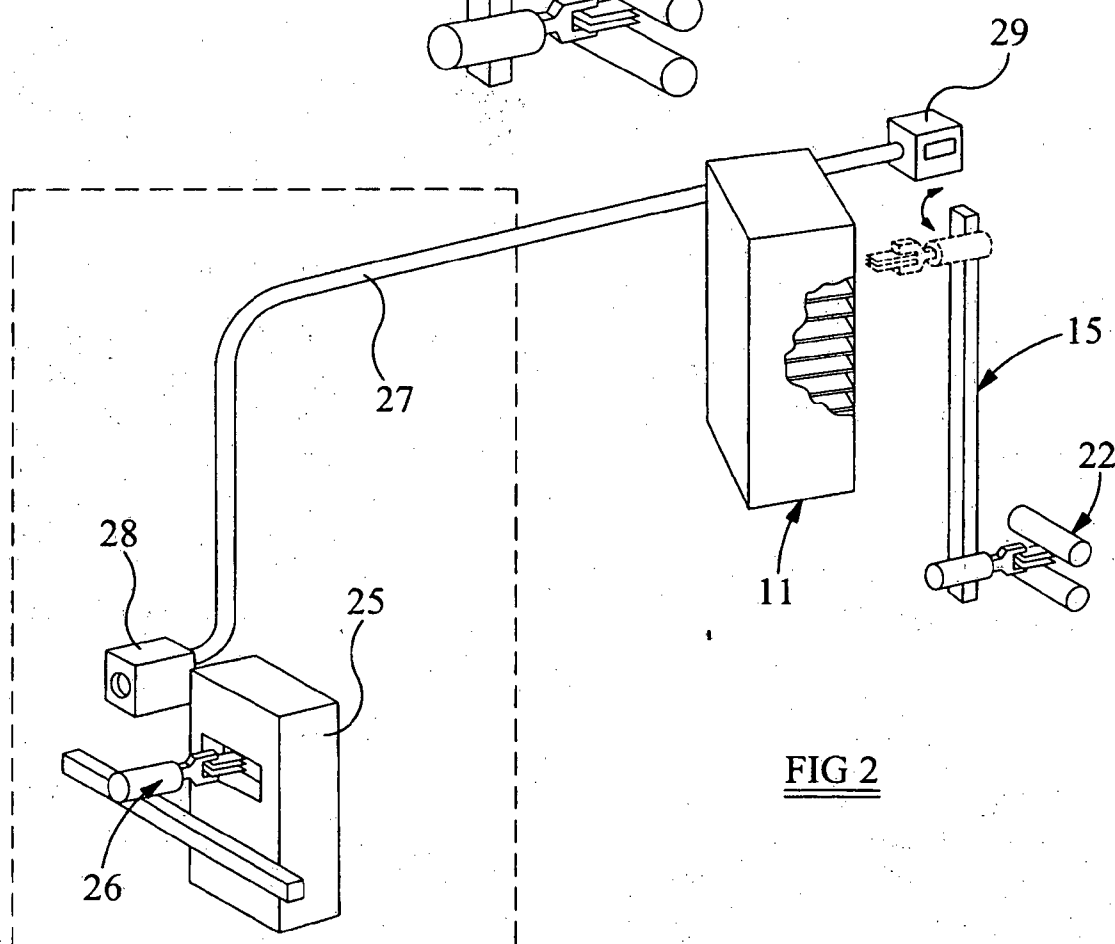
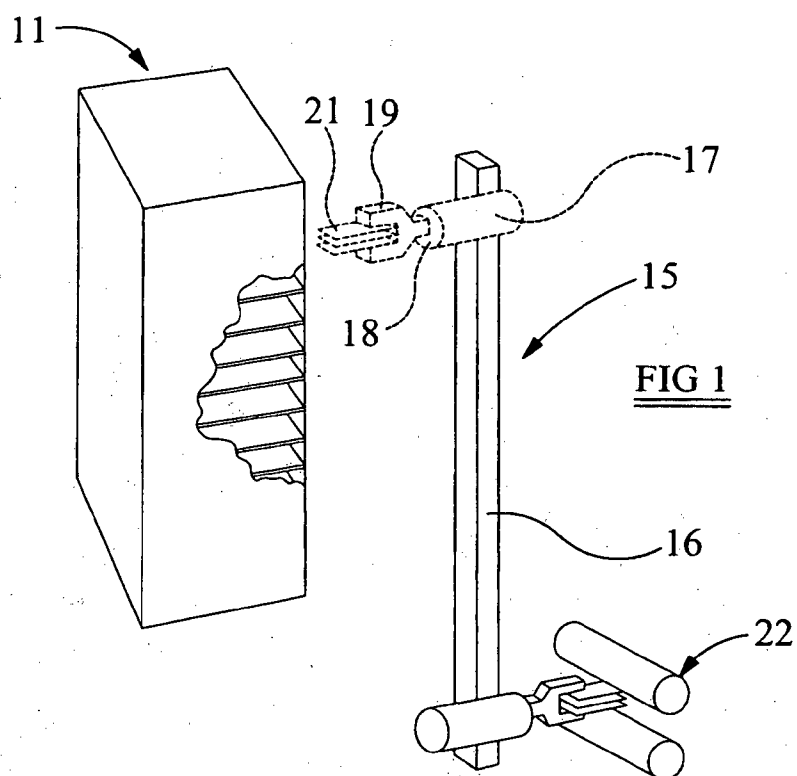
une pince (35) présentant une paire de plaques de pince (36, 37) essentiellement parallèles pouvant se déplacer l'une vers l'autre afin de pincer la liasse entre lesdites plaques, et

un agencement d'actionnement (44) configuré pour actionner les plaques de pince l'une vers l'autre avec une force de pincement prédéterminée,

dans lequel les plaques de pince (36, 37) sont formées de manière à comprendre une partie non pincée (40a, 40b) de la liasse entre les plaques du dispositif porteur ; et

un extracteur (112) permettant de retirer la liasse du dispositif porteur, dans lequel l'extracteur comprend un dispositif de pince-

- ment d'extraction configuré pour pincer la liasse en venant en contact avec le haut et le bas de la liasse au niveau de ladite partie non pincée (40a, 40b) avec une deuxième force de pincement qui est supérieure à la force de pincement prédéterminée actionnant les plaques de pince (36, 37) du dispositif porteur.
2. Système selon la revendication 1, dans lequel les plaques (36, 37) sont formées de manière à recevoir la liasse à partir d'une direction d'insertion essentiellement parallèle aux surfaces de pincement des plaques.
3. Système selon la revendication 2, dans lequel les plaques (36, 37) sont formées de manière à fournir un bec d'entrée permettant une insertion d'une liasse entre les plaques.
4. Système selon l'une quelconque des revendications précédentes, dans lequel le dispositif porteur présente une paroi extérieure partiellement cylindrique qui s'étend autour d'une partie arrière du dispositif porteur et une partie avant ouverte permettant une insertion et une extraction de la liasse.
5. Système selon l'une quelconque des revendications précédentes, comprenant en outre un mécanisme de dépôt permettant d'insérer une liasse de billets dans le dispositif porteur (30).
6. Système selon la revendication 5, dans lequel le mécanisme de dépôt est configuré pour ouvrir la pince et insérer la liasse dans le dispositif porteur.
7. Système selon l'une quelconque des revendications précédentes, le système comprenant en outre :
- un poste de traitement (110) accueillant ledit dispositif porteur, dans lequel le poste de traitement comprend :
- ledit extracteur (112) et un dispositif de traitement de billets (118), dans lequel ledit extracteur est en outre configuré pour insérer les billets dans le dispositif de traitement de billets, dans lequel le dispositif de traitement de billets comprend un ou plusieurs parmi : un compteur de billets, un validateur de billets et un recycleur de billets ; et un dispositif de commande (124) commandant le fonctionnement dudit système.
8. Système selon la revendication 7, dans lequel le dispositif de commande (124) comprend un ordinateur programmé avec un logiciel permettant de commander le fonctionnement dudit système.
9. Système selon la revendication 7 ou 8, dans lequel le poste de traitement (110) et une partie ou la totalité du dispositif de commande (124) sont enfermés au sein d'un boîtier (130) construit conformément aux normes ATM et/ou de sécurité.



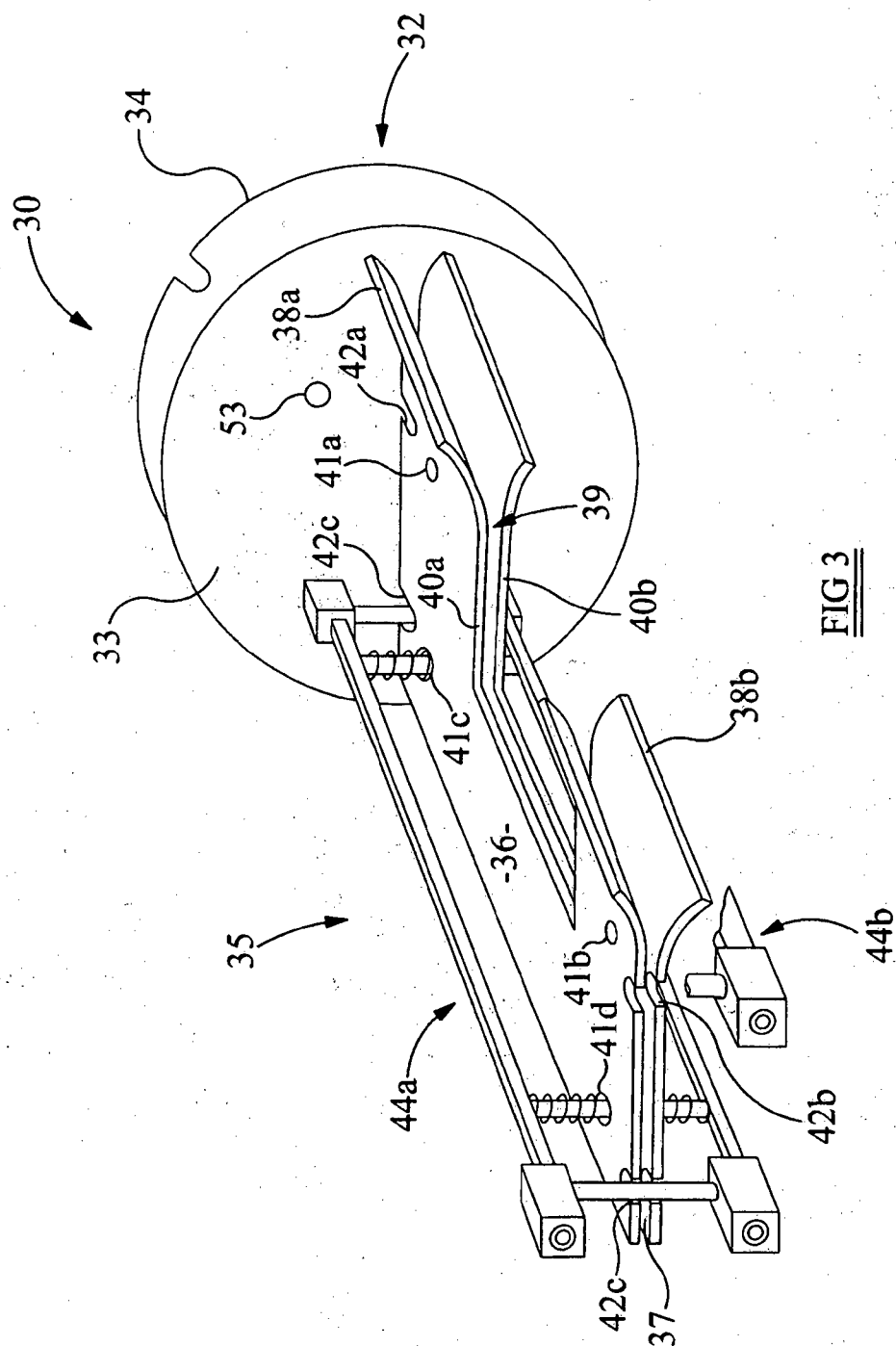
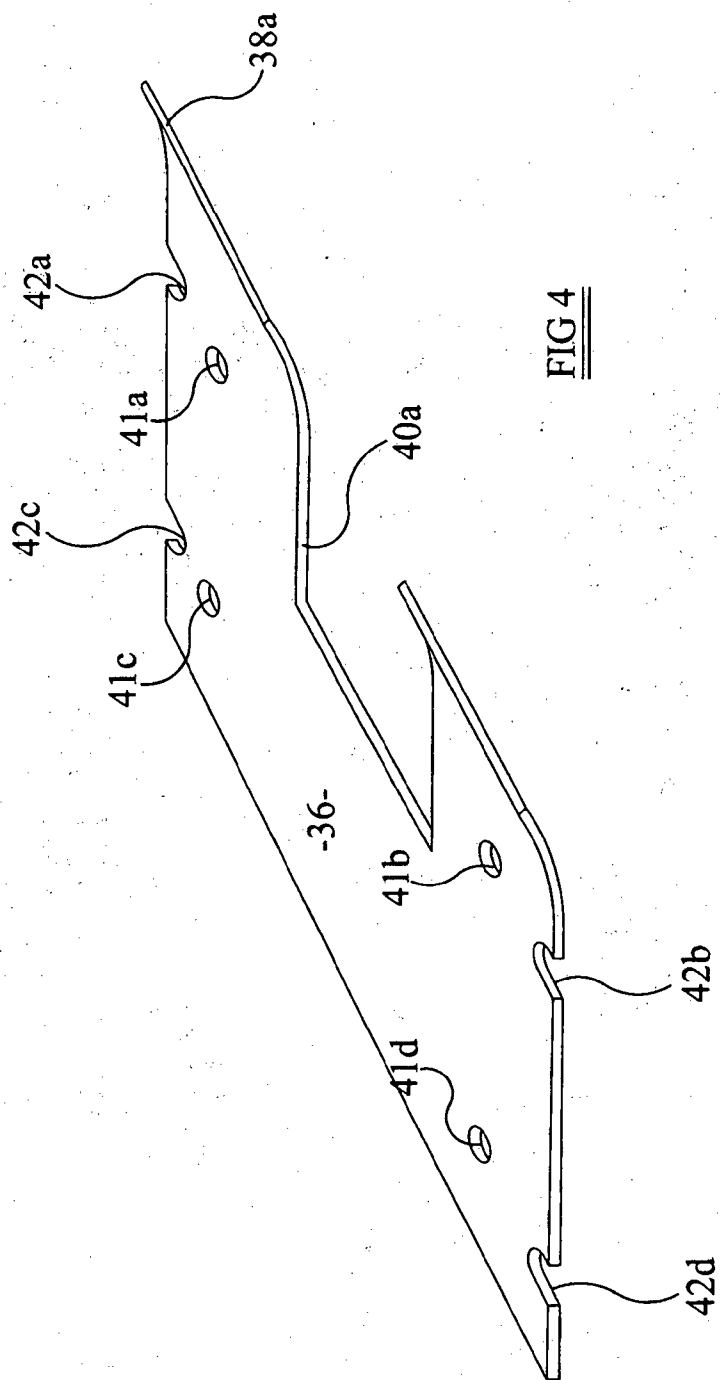


FIG 3



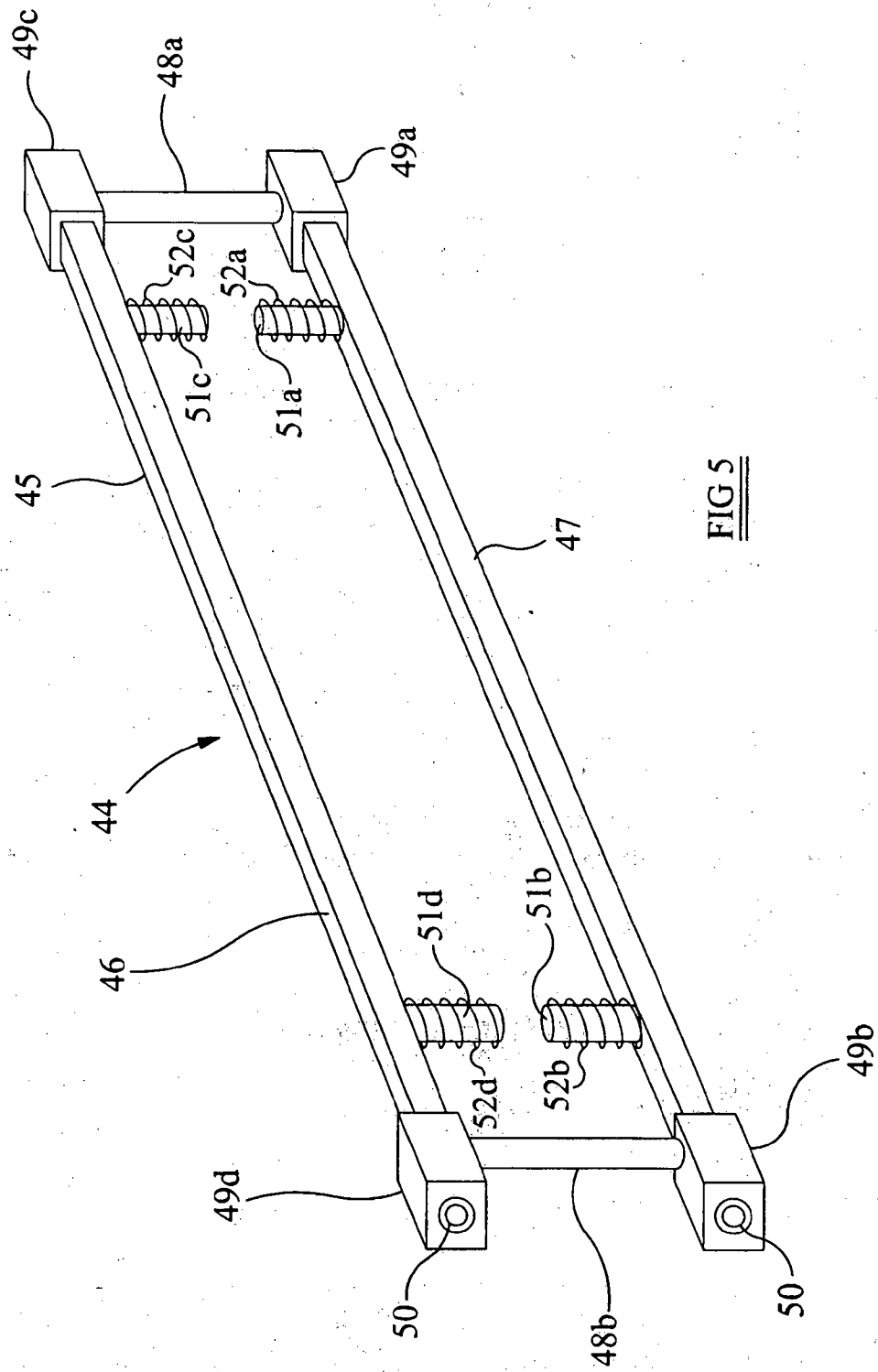


FIG 5

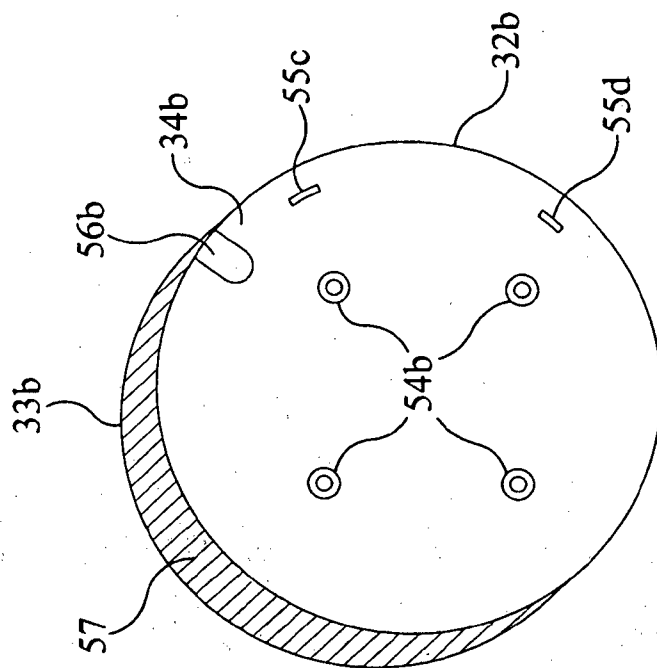


FIG 6b

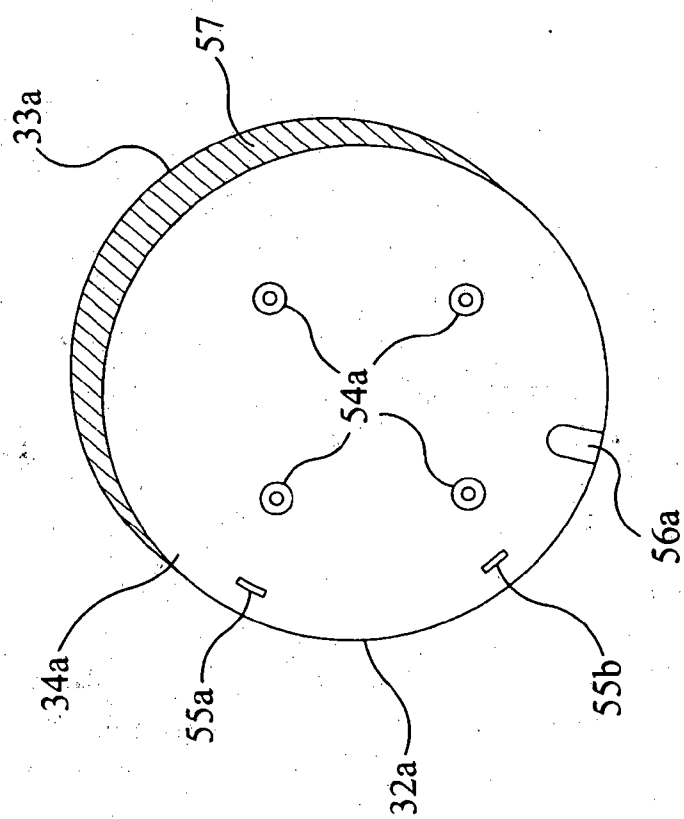
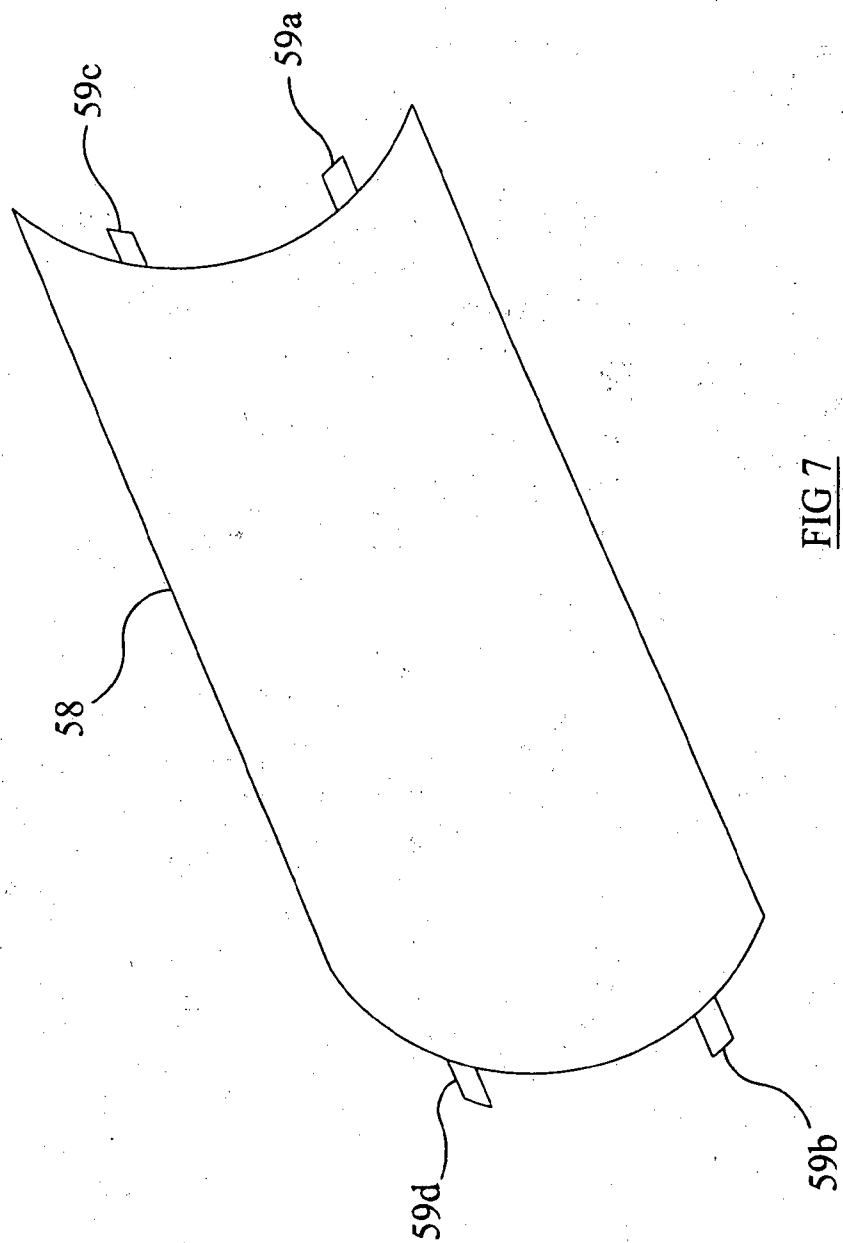


FIG 6a



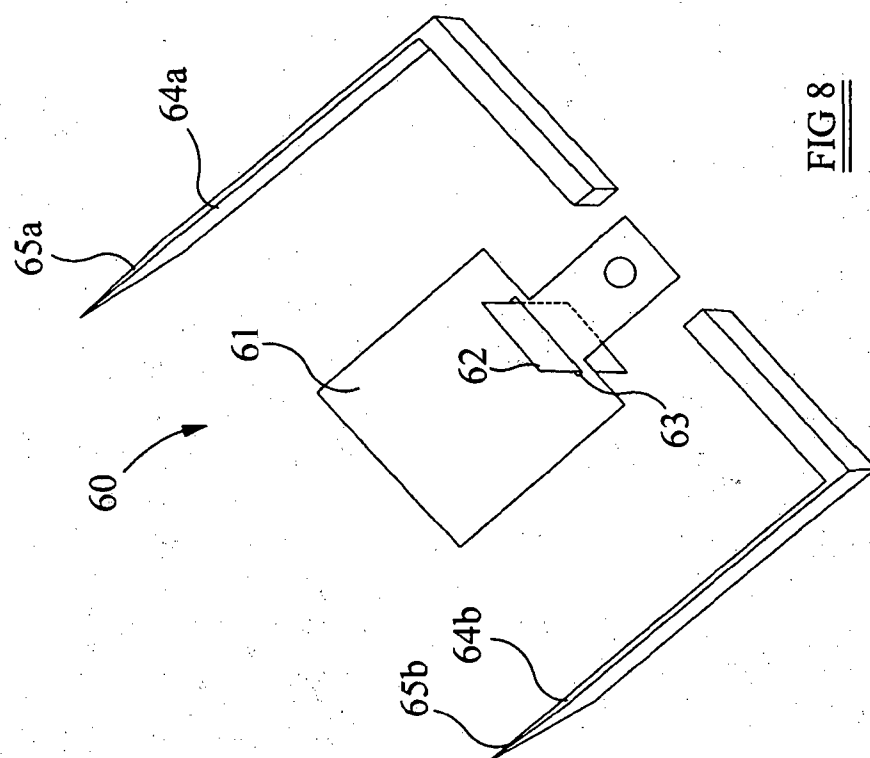


FIG 8

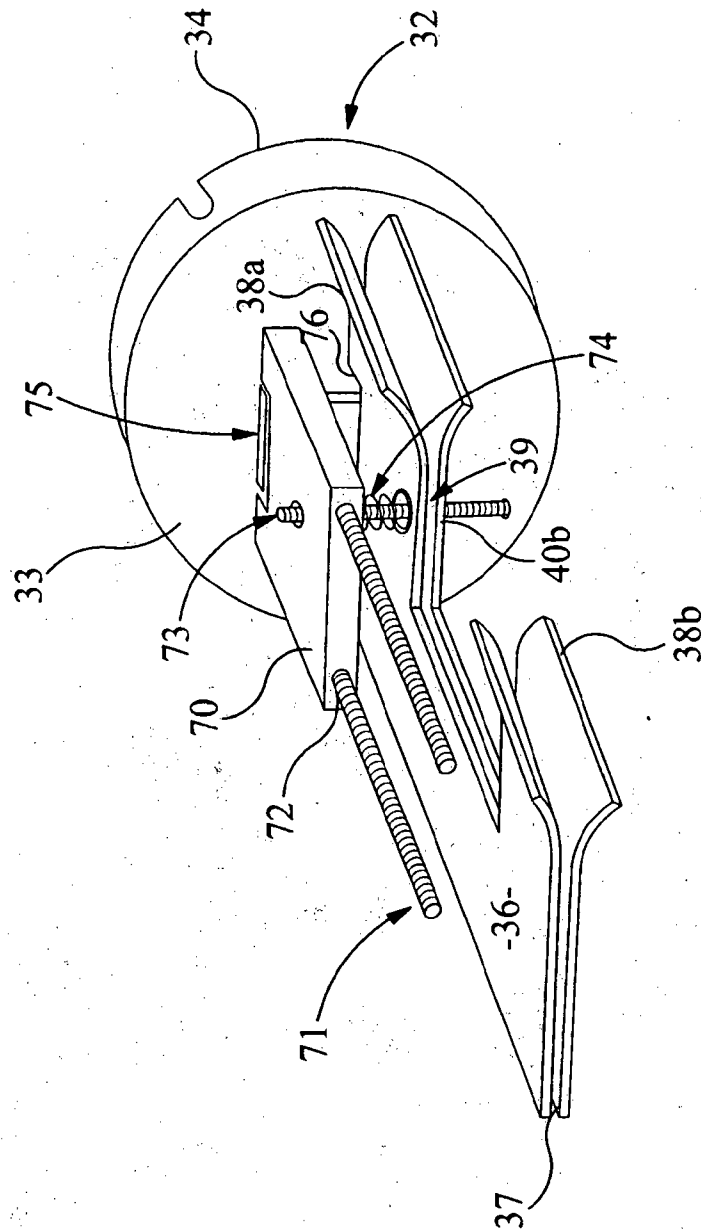
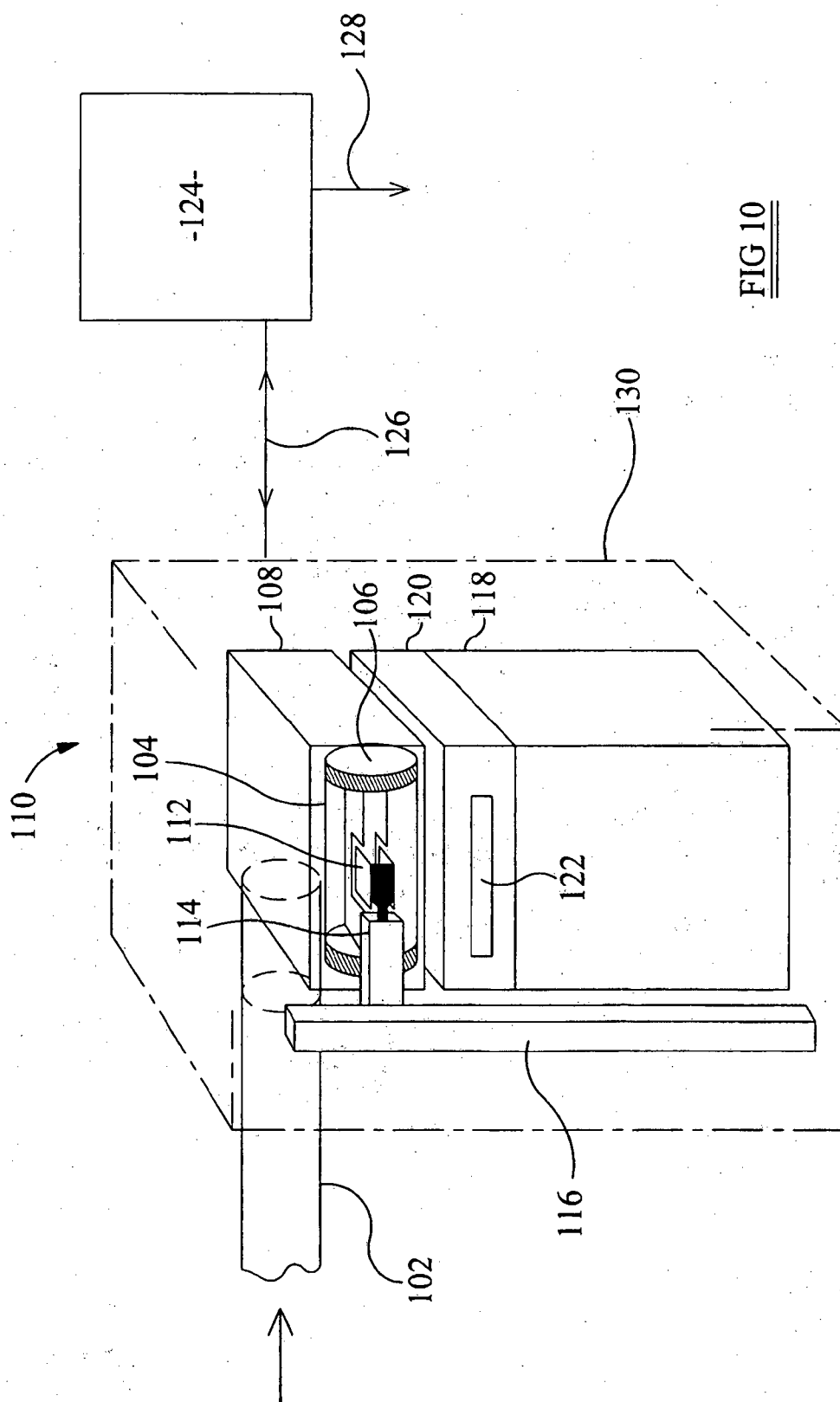


FIG 9



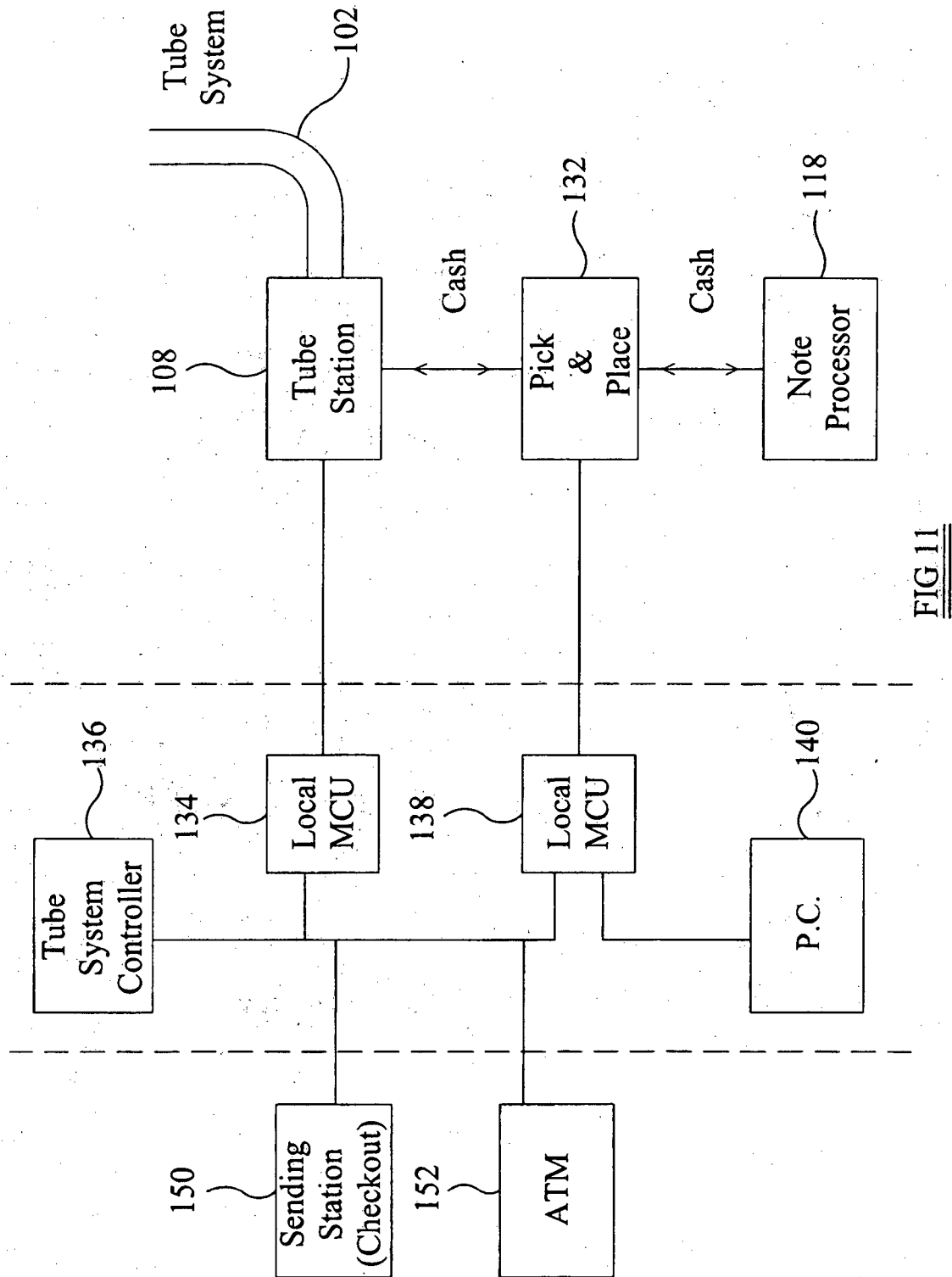


FIG 11

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- GB 2305901 A [0002]
- EP 0841644 A [0003]
- US 5101979 A [0006]
- EP 1001387 A [0007]

Szabadalmi igénypontok

1. Rendszer bankjegyköteg szállítására tárolóhelyről kiadóhoz, a rendszer tartalmaz:
pneumatikus csőves szállító berendezést (27);
hordozóberendezést (30), amelynek van korong alakú végrésze mindegyik végen és
5 fogóelrendezést, amely helyen van tartva a végrészek között, a fogóelrendezés tartalmaz:
fogóberendezést (35), amelynek van egy pár lényegében párhuzamos fogólemeze (36, 37),
amelyek mozgathatók egymás felé a köteg megragadására a lemezek között, és
feszítő elrendezést (44), amely úgy van kialakítva, hogy egymáshoz szorítsa a fogólemezeket előre
meghatározott fogó erővel,
10 ahol a fogólemezek (36, 37) úgy vannak kialakítva, hogy magában foglalja a köteg egy nem
megfogott részét (40a, 40b) a lemezek között a hordozóberendezésben; és
kivevőt (112) a köteg eltávolítására a hordozóberendezésből, ahol a kivevő tartalmaz kivevő fogó
berendezést, amely úgy van kialakítva, hogy megragadja a köteget a köteg tetejének és aljának
kontaktálásával a nem megfogott részen (40a, 40b) második fogó erővel, amely nagyobb, mint az előre
15 meghatározott fogóerő, amely feszíti a fogólemezeket (36, 37) a hordozóberendezésben.
2. Az 1. igénypont szerinti rendszer, ahol a lemezek (36, 37) úgy vannak kialakítva, hogy befogadja
a köteget a berakási irányból, amely lényegében párhuzamos a lemez fogófelületeivel.
3. A 2. igénypont szerinti rendszer, ahol a lemezek (36, 37) úgy van kialakítva, hogy száját
bocsásson rendelkezésre köteg behelyezésére a lemezek közé.
- 20 4. Az előző igénypontok bármelyike szerinti rendszer, ahol a hordozóberendezésnek van részhenger
külső fala, amely kiterjed hordozóberendezés hátsó része és nyitott első része körül köteg behelyezésére és
kivevésére.
5. Az előző igénypontok bármelyike szerinti rendszer, amely továbbá tartalmaz lerakó mechanizmust
bankjegyköteg behelyezésére a hordozóberendezésbe (30).
- 25 6. Az 5. igénypont szerinti rendszer, ahol a lerakó mechanizmus úgy van kialakítva, hogy felnyomja
a fogóberendezést és benyomja a köteget hordozóberendezésbe.
7. Az előző igénypontok bármelyike szerinti rendszer, ahol a rendszer továbbá tartalmaz:
feldolgozó állomást (110), amely befogadja a hordozóberendezést, ahol a feldolgozó állomás
tartalmaz:
30 a kivevőt (112) és bankjegy feldolgozó berendezést (118), ahol a kivevő továbbá úgy van
kialakítva, hogy bedugja a bankjegyeket a bankjegy feldolgozó berendezésbe, ahol a bankjegy feldolgozó
berendezés tartalmaz a következők közül egyet vagy többet: bankjegy számlálót, bankjegy vizsgálót és a
bankjegy visszavezetőt; és
vezérlőberendezést (124), amely vezérli a rendszer működését.
- 35 8. A 7. igénypont szerinti rendszer, ahol a vezérlőberendezés (124) tartalmaz számítógépet, amely
szoftverrel van programozva a rendszer működésének vezérlésére.

9. A 7. vagy 8. igénypont szerinti rendszer, ahol a feldolgozó állomás (110) és a vezérlőberendezés (124) egy része vagy egésze be van zárva a házba (130), amely ATM-el és/vagy biztonságos osztályozási standardekkel összhangban van építve.

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