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

(11) EP 2 146 331 A1

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
**20.01.2010 Bulletin 2010/03**

(21) Application number: **07743078.3**

(22) Date of filing: **10.05.2007**

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

(86) International application number:
**PCT/JP2007/059643**

(87) International publication number:
**WO 2008/139584 (20.11.2008 Gazette 2008/47)**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR**
Designated Extension States:
**AL BA HR MK RS**

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# (54) PAPER MONEY PROCESSOR

(57) A banknote processing machine 11 which can be set to a banknote putting-in one by one mode and a banknote putting-in collectively mode and can reliably keep a state of the banknote putting-in one by one mode is provided. An opening regulating member 37 is provided which sets an opening size of an inlet 13a in a put-in banknote thickness direction to an opening size for putting banknotes in one by one and an opening size for putting banknotes in collectively. A fixing unit 41 fixes the opening regulating member 37 to a position of the opening size for putting banknotes in one by one and regulates setting the position of the opening regulating member 37 to the position of the opening size for putting banknotes in collectively. In the case of an operator unused to the operation, the banknote putting-in one by one mode is adopted to reduce a banknote jam in depositing. In the case of an operator used to the operation of banknote replenishment, the banknote putting-in collectively mode is adopted to improve efficiency in the banknote replenishment.

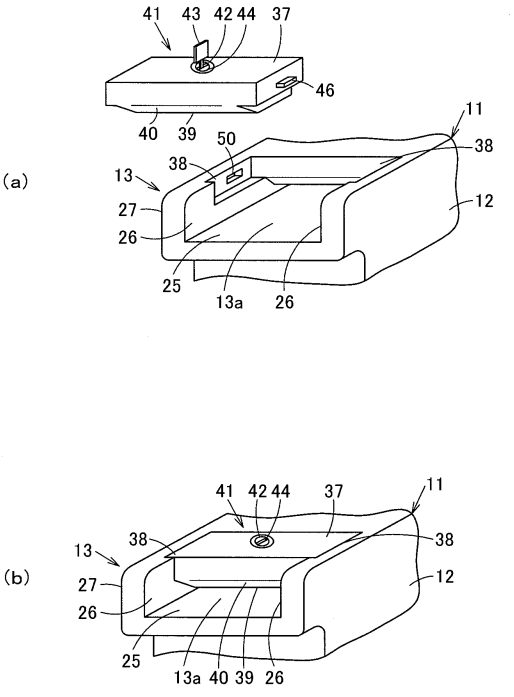


FIG. 1

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## Description

TECHNICAL FIELD

**[0001]** The present invention relates to a banknote processing machine which enables a plurality of banknotes to be put in an inlet one by one or collectively.

BACKGROUND ART

**[0002]** There exists a banknote processing machine which has been conventionally used for a so-called banknote changer for a cash register which is connected to, for example, a POS cash register to automatically perform depositing and dispensing of banknotes and in which banknotes for replenishment are put by specified clerks.

**[0003]** In such a banknote processing machine, an inlet, in which banknotes to be deposited are put, is used as a replenishment port inwhichbanknotes for replenishment are put (see, for example, Patent Document 1), and a plurality of banknotes can be put in collectively and processed for improving work efficiency. Thus, an operator used to the operation can perform other work while collectively putting a plurality of banknotes for replenishment in the port.

**[0004]** However, in the banknote processing machine enabling collectively putting in and processing a plurality of banknotes, when an operator unused to the operation collectively puts a plurality of banknotes in the port with the banknotes not aligned, a banknote jam is easily caused in a feeding mechanism or transporting mechanism in the banknote processing machine. Particularly, when Euro banknotes or Chinese banknotes, which have sizes very different for each denomination, are handled, directions of a plurality of small banknotes, which are stacked and hidden behind large banknotes, are sometimes different from each other. When the banknotes in this state are collectively put in the inlet, the small banknotes are obliquely taken in, thereby easily causing a banknote jam in the feeding mechanism or transporting mechanism in the banknote processing machine.

**[0005]** Additionally, for preventing a banknote jam, it is considered that banknotes are restrictively put in one by one. For example, the thicknesses of put-in banknotes are detected, and a banknote having a thickness out of regulation may be returned (see, for example, Patent Document 2).

**[0006]** However, when a plurality of banknotes are restrictively put in one by one, it takes a lot of time, inbanknote replenishment, to put in a large number of banknotes.

**[0007]** Thereupon, an opening regulating member is turnably provided at an inlet so that an operator can arbitrarily change the size of the inlet. An operator unused to the operation narrows the inlet to put banknotes therein one by one, and an operator used to the operation widens the inlet to collectively put a plurality of banknotes therein. Thus, a banknote jam due to collectively putting in a plurality of banknotes by the operator unused to the operation is prevented, and further replenishment work is made efficient due to collectively putting in a plurality of banknotes by the operator used to the operation (see, for example, Patent Document 3).

Patent Document 1: Japanese Laid-open Patent Publication No. 10-49753 (p.5, Fig. 3)
Patent Document 2: Japanese Laid-open Patent Publication No. 2002-32816 (p.4, Fig. 1)
Patent Document 3: Japanese Laid-open Patent Publication No. 2006-236108 (p.5, Fig. 4)

DISCLOSURE OF THE INVENTION

Problems to be Solved by the Invention

**[0008]** By using the technique disclosed in the above Patent Document 3, it is possible to use a mode of urging putting banknotes in one by one, in normal depositing, or a mode of collectively putting in a plurality of banknotes, in banknote replenishment.

**[0009]** However, since an opening regulating member for changing the size of an inlet is freely turnable and anyone can adopt the mode of collectively putting in a plurality of banknotes by lifting up the opening regulating member, a banknote jam due to, for example, collectively putting in a plurality of banknotes by an operator unused to the operation cannot be completely prevented.

**[0010]** The present invention has been made in view of the above problem, and aims to provide a banknote processing machine capable of reliably preventing a banknote jam while keeping work efficiency by a banknote putting-in collectively mode.

Means to Solve the Problems

**[0011]** A banknote processing machine according to Claim 1 of the present invention includes: an inlet in which a plurality of banknotes can be put collectively; an opening regulating member for setting an opening size of the inlet in a put-in banknote thickness direction to an opening size for putting banknotes in one by one and an opening size for putting banknotes in collectively at the least; and a fixing unit capable of fixing the opening regulating member to a position of the opening size for putting banknotes in one by one at the least.

**[0012]** With a banknote processing machine according to Claim 2 of the present invention, in the banknote processing machine according to Claim 1, the fixing unit includes a locking unit for fixing the opening regulating member to the position of the opening size for putting banknotes in one by one at the least, and a keying unit for operating the locking unit into a fixing state and a fixation releasing state.

**[0013]** With a banknote processing machine according to Claim 3 of the present invention, in the banknote

processing machine according to Claim 1, the fixing unit releases fixation of the opening regulating member and can set a position of the opening regulating member to a position of the opening size for putting banknotes in collectively when it is checked that an operator has authorization for putting banknotes in collectively by an authorization checking unit for checking whether an operator has authorization for putting banknotes in collectively.

**[0014]** With a banknote processing machine according to Cliam 4 of the present invention, in the banknote processing machine according to Claim 1, the fixing unit releases fixation of the opening regulating member and can set the position of the opening regulating member to the position of the opening size for putting banknotes in collectively when it is checked that an operator has authorization for putting banknotes in collectively by the authorization checking unit for checking whether an operator has authorization for putting banknotes in collectively and then an operation unit for issuing an instruction of putting banknotes in collectively is operated.

**[0015]** With a banknote processing machine according to Claim 5 of the present invention, in the banknote processing machine according to Claim 3 or 4, the opening regulating member is movably provided between the position of the opening size for putting banknotes in one by one and the position of the opening size for putting banknotes in collectively, and the fixing unit includes a fixing member capable of fixing the opening regulating member to the position of the opening size for putting banknotes in one by one, and a driving unit for moving the fixing member to a fixing position and fixation releasing position of the opening regulating member.

**[0016]** With a banknote processing machine according to Claim 6 of the present invention, in the banknote processing machine according to Claim 2 or 5, there are provided: a feeding mechanism for separating and feeding banknotes put in the inlet to a transport unit one by one; an opening regulating member position detecting unit for detecting that the opening regulating member is located at the position of the opening size for putting banknotes in one by one; and a controlling unit which, when it is checked that an operator has no authorization for putting banknotes in collectively by the authorization checking unit for checking whether an operator has authorization for putting banknotes in collectively, operates the feeding mechanism if the opening regulating member position detecting unit detects the opening regulating member, and does not operate the feeding mechanism if the opening regulating member position detecting unit does not detect the opening regulating member.

**[0017]** With a banknote processing machine according to Claim 7 of the present invention, in the banknote processing machine according to Claim 3 or 4 , the opening regulating member is movable in the put-in banknote thickness direction of the inlet, the fixing unit includes a driving unit for moving the opening regulating member in the put-in banknote thickness direction of the inlet, and a controlling unit is provided which controls the driving unit to move the opening regulating member to the position of the opening size for putting banknotes in one by one and the position of the opening size for putting banknotes in collectively at the least.

**[0018]** With a banknote processing machine according to Claim 8 of the present invention, in the banknote processing machine according to Claim 1, there are provided; a banknote putting-in detecting unit for detecting banknotes put in the inlet; a feeding mechanism for separating and feeding banknotes put in the inlet to a transport unit one by one; a banknote passage detecting unit for detecting passage of the banknote fed to the transport unit by the feedingmechanism; andacontrollingunit for operating the feeding mechanism until the banknote putting-in detecting unit detects no banknote, in the case where it is checked that an operator has authorization for putting banknotes in collectively by the authorization checking unit for checking whether an operator has authorization for putting banknotes in collectively, and for operating the feeding mechanism, and then stopping operation of the feeding mechanism when the banknote passage detecting unit detects passage of one banknote, in the case where it is checked an operator has no authorization for putting banknotes in collectively.

**[0019]** A banknote processing machine according to Claim 9 of the present invention includes: an inlet in which a plurality of banknotes can be put collectively; a banknote putting-in detecting unit for detecting banknotes put in the inlet; a feeding mechanism for separating and feeding banknotes put in the inlet to a transport unit one by one; a banknote passage detecting unit for detecting passage of the banknote fed to the transport unit by the feeding mechanism; and a controlling unit for operating the feeding mechanism until the banknote putting-in detecting unit detects no banknote, in the case where it is checked that an operator has authorization for putting banknotes in collectively by the authorization checking unit for checking whether an operator has authorization for putting banknotes in collectively, and for operating the feeding mechanism, and then stopping operation of the feeding mechanism when the banknote passage detecting unit detects passage of one banknote, in the case where it is checked an operator has no authorization for putting banknotes in collectively.

**[0020]** With a banknote processing machine according to Claim 10 of the present invention, in the banknote processing machine according to Claim 8 or 9, the controlling unit, in the case where it is checked an operator has no authorization for putting banknotes in collectively by the authorization checking unit, stops operation of the feeding mechanism when the banknote passage detecting unit detects passage of a banknote, and thereafter operates the feeding mechanism if the banknote putting-in detecting unit re-detects a banknote after banknote detection is stopped.

Effect of the Invention

**[0021]** According to a banknote processing machine of Claim 1 of the present invention, since an opening regulating member for setting an opening size of an inlet in a put-in banknote thickness direction to an opening size for putting banknotes in one by one and an opening size for putting banknotes in collectively at the least can be fixed to a position of the opening size for putting banknotes in one by one at the least by a fixing unit, setting of a position of the opening regulating member to a positionof the opening size forputtingbanknotes in collectively can be reliably regulated. Thus, for example, in the case of an operator unused to the operation, a banknote jam in depositing can be reduced with use of a banknote putting-in one by one mode, and in the case of an operator used to the operation of performing banknote replenishment, etc., efficiency of the banknote replenishment can be improved with use of a banknote putting-in collectively mode.

**[0022]** According to a banknote processing machine of Claim 2 of the present invention, in addition to the effect of the banknote processing machine of Claim 1, only an operator having authorization for putting banknotes in collectively can change a position of the opening regulating member with use of a keying unit, because the fixing unit includes: a locking unit capable of fixing the opening regulating member to the position of the opening size for putting banknotes in one by one at the least; and the keying unit for operating the locking unit into a fixing state and a fixation releasing state.

**[0023]** According to a banknote processing machine of Claim 3 of the present invention, in addition to the effect of the banknote processing machine of Claim 1, when it is checked that an operator has authorization for putting banknotes in collectively by an authorization checking unit for checking whether an operator has authorization for putting banknotes in collectively, only the operator having authorization for putting banknotes in collectively can change the position of the opening regulating member, because the fixing unit releases fixation of the opening regulating member and can set the position of the opening regulating member to the position of the opening size for putting banknotes in collectively.

**[0024]** According to a banknote processing machine of Claim 4 of the present invention, in addition to the effect of the banknote processing machine of Claim 1, when an operation unit for issuing an instruction of putting banknotes in collectively is operated after it has been checked that an operator has authorization for putting banknotes in collectively by the authorization checking unit for checking whether an operator has authorization for putting banknotes in collectively, only the operator having authorization for putting banknotes in collectively can change the position of the opening regulating member, because the fixing unit releases fixation of the opening regulating member and can set the position of the opening regulating member to the position of the opening size for putting banknotes in collectively.

**[0025]** According to a banknote processing machine of Claim 5 of the present invention, in addition to the effect of the banknote processing machine of Claim 3 or 4, the fixing unit can automatically fix the opening regulating member to the position of the opening size for putting banknotes in one by one and release the fixation when it is checked that an operator has authorization for putting banknotes in collectively, because the fixing unit includes a fixing member capable of fixing the opening regulating member to the position of the opening size for putting banknotes in one by one, and a driving unit for moving the fixing member to a fixing position and f ixat ion releasing posit ion of the opening regulating member.

**[0026]** According to a banknote processing machine of Claim 6 of the present invention, in addition to the effect of the banknote processing machine of Claim 2 or 5, when it is checked that an operator has no authorization for putting banknotes in collectively by the authorization checking unit for checking whether an operator has authorization for putting banknotes in collectively, a feeding mechanism is operated and one banknote is fed to a transport unit if the opening regulating member position detecting unit detects the opening regulating member is located at the position of the opening size for putting banknotes in one by one, and the feeding mechanism is not operated and a banknote jam due to putting banknotes in collectively can be prevented if the opening regulating member position detecting unit does not detect the opening regulating member is located at the position of the opening size for putting banknotes in one by one.

**[0027]** According to a banknote processing machine of Claim 7 of the present invention, in addition to the effect of the banknote processing machine of Claim 3 or 4, the fixing unit can automatically change the position of the opening regulating member when it is checked that an operator has authorization for putting banknotes in collectively, because the fixing unit includes a driving unit for moving the opening regulating member to the position of the opening size for putting banknotes in one by one and the position of the opening size for putting banknotes in collectively at the least.

**[0028]** According to a banknote processing machine of Claim 8 of the present invention, in addition to the effect of the banknote processing machine of Claim 1, only one banknote can be fed to a transport unit even if a plurality of banknotes are collectively put in the inlet, because when it is checked that an operator has authorization for putting banknotes in collectively by the authorization checking unit for checking whether an operator has authorization for putting banknotes in collectively, the feeding mechanism is operated, banknotes put in the inlet are separated and fed to the transport unit one by one, and the feeding mechanism is continuously operated until a banknote putting-in detecting unit provided at the inlet detects no banknote if a plurality of banknotes are collectively put in the inlet; and when it is checked that an operator has no authorization for putting banknotes

in collectively, the feeding mechanism is operated, banknotes put in the inlet are separated and fed one by one to the transport unit, and the feeding mechanism is stopped when a banknote passage detecting unit provided on the transport unit detects passage of one banknote.

**[0029]** According to a banknote processing machine of Claim 9 of the present invention, in the case of, for example, an operator unused to the operation, a banknote jam in depositing can be reduced with use of a banknote putting-in one by one mode, and in the case of an operator used to the operation of performing banknote replenishment, etc., efficiency of the banknote replenishment can be improved with use of a banknote putting-in collectively mode, because in the case where its is checked that an operator has authorization for putting banknotes in collectively by the authorization checking unit for checking whether an operator has authorization for putting banknotes in collectively, the feeding mechanism is operated, banknotes put in an inlet are separated and fed to a transport unit one by one, and the feeding mechanism is continuously operated until a banknote putting-in detecting unit provided at the inlet detects no banknote if a plurality of banknotes are collectively put in the inlet, and in the case where it is checked that an operator has no authorization for putting banknotes in collectively, the feeding mechanism is operated, banknotes put in the inlet are separated and fed one by one to the transport unit, and operation of the feeding mechanism is stopped when a banknote passage detecting unit provided on the transport unit detects passage of one banknote, and thus only one banknote can be fed to the transport unit even if a plurality of banknotes are collectively put in the inlet.

**[0030]** According to a banknote processing machine of Claim 10 of the present invention, in addition to the effect of the banknote processing machine of Claim 8 or 9, one banknote can be further fed to the transport unit by re-putting-in a banknote in the case where it is checked that an operator has no authorization for putting banknotes in collectively by the authorization checking unit, because operation of the feeding mechanism is stopped when the banknote passage detecting unit provided on the transport unit detects passage of a banknote, and thereafter the feeding mechanism is operated if the banknote putting-in detecting unit detects a banknote which is re-put in the inlet by the operator after the operator has taken out banknotes remaining in the inlet and the banknote putting-in detecting unit has detected no banknote.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0031]**

Fig. 1 shows a banknote processing machine of a first embodiment of the present invention, Fig. 1(a) is a perspective view of a state where an opening regulating member is detached from an inlet, and Fig. 1(b) is a perspective view of a state where the opening regulating member is fixed to a position of an opening size for putting banknotes in one by one.

Fig. 2 is a plan view of the opening regulating member.

Fig. 3 is a side view showing a feeding mechanism and transport unit of the banknote processing machine.

Fig. 4 is a perspective view of the banknote processing machine.

Fig. 5 is a structural view of the banknote processing machine.

Fig. 6 is a block diagram of the banknote processing machine.

Fig. 7 shows a banknote processing machine of a second embodiment of the present invention and is a perspective view of a state where an opening regulating member is opened from the inlet.

Fig. 8 shows a banknote processing machine of a third embodiment of the present invention, Fig. 8(a) is a side view of a state where an opening regulating member is fixed to the position of the opening size for putting banknotes in one by one, and Fig. 8(b) is a side view of a state where the opening regulating member is moved to a position of an opening size for putting banknotes in collectively.

Fig. 9 shows a banknote processing machine of a fourth embodiment of the present invention, Fig. 9 (a) is a side view of a state where an opening regulating member is fixed to the position of the opening size for putting banknotes in one by one, and Fig. 9 (b) is a side view of a state where the opening regulating member is moved to the position of the opening size for putting banknotes in collectively.

Fig. 10 is a side view showing a feeding mechanism and transport unit of a banknote processing machine of a fifth embodiment of the present invention.

Fig. 11 is a perspective view of the vicinity of an inlet of a banknote processing machine of a sixth embodiment of the present invention.

Fig. 12 is a side view of the vicinity of the inlet.

## REFERENCE NUMERALS

**[0032]**

| | |
|---|---|
| 11 | Banknote processing unit |
| 13a | Inlet |
| 15 | Operation unit |
| 18 | Transport unit |
| 21 | Controlling unit |
| 23 | Authorization checking unit |
| 29 | Feeding mechanism |
| 32 | Putting-insensorasbanknoteputting-indetectingunit |
| 33 | Tracking sensor as banknote passage detecting unit |
| 37 | Opening regulating member |
| 41 | Fixing unit |

42 Locking unit
43 Keying unit
46 Fixing member
64 Solenoid as driving unit
65 Fixing member
71 Motor as driving unit

## BEST MODE FOR CARRYING OUT THE INVENTION

**[0033]** Hereinafter, embodiments of the present invention will be described with reference to the drawings.

**[0034]** Figs. 1 to 6 show a first embodiment.

**[0035]** As shown in Fig. 5, a banknote processing machine 11 is a so-calledbanknote changer for a cash register which is connected to, for example, a POS cash register to automatically perform depositing and dispensing of banknotes and in which banknotes for replenishment are put by specified clerks.

**[0036]** A depositing unit 13, in which a plurality of banknotes to be deposited or banknotes for replenishment can be put collectively, a dispensing unit 14 for dispensing banknotes and an operation unit 15, with which an operator performs a predetermined operation, are disposed at a front face side of a unit body 12 of the banknote processing machine 11. Additionally, a reject box 16 for storing rejected banknotes recognized, for example, in dispensing and a collection cassette 17 for storing banknotes to be collected from the unit body 12 are disposed drawable from the unit body 12.

**[0037]** A transport unit 18 for transporting banknotes is formed in the unit body 12, and a recognition unit 19 for recognizing an authenticity or denomination of a banknote is disposed on the transport unit 18.

**[0038]** The transport unit 18 transports banknotes separated one by one and taken in from the depositing unit 13, and transports the corresponding banknotes to the dispensing unit 14, reject box 16 and collection cassette 17.

**[0039]** Denomination-specific storing portions 20 for storing banknotes for each denomination are disposed in the unit body 12, and banknotes can enter/exit each storing portion 2 into/from the transport unit 18.

**[0040]** The banknote processing machine 11 includes a controlling unit 21 for controlling the banknote processing machine 11, and the controlling unit 21 is connected to a higher-ranking machine 22 such as a POS cash register and controls the banknote processing machine 11 based on instructions from the higher-ranking machine 22. Anauthorizationcheckingunit 23 for checking authorization of an operator is connected to the higher-ranking machine 22. In a check by the authorization checking unit 23, the following checks are involved: a knowledge check on a personal code number, password or the like; a possession check on a mode change key, magnetic card, IC card or the like; and a living body check containing body recognition on a fingerprint, face or the like, and action recognition on signing, vocalizing or the like.

**[0041]** Additionally, as shown in Fig. 4, the unit body 12 of the banknote processing machine 11 is vertically constituted, and the depositing unit 13, the dispensing unit 14, a mode key 24 and the collection cassette 17 are disposed, in this order from its upper side, at the front face side of the unit body 12. A drawer unit including the units disposed at the front face side of the unit body 12 and mechanisms arranged in the unit body 12, etc., is constituted drawable forward in relation to the unit body 12.

**[0042]** An inlet 13a, in which a plurality of banknotes to be dispensed or banknotes for replenishment can be put collectively, is formed in the depositing unit 13, and an outlet 14a for dispensing banknotes is formed in the dispensing unit 14.

**[0043]** The mode key 24 is operated by a key used by an operator, manager or the like having authorization, and switching can be made between an operation mode for performing general transactions, a management mode for performing collection of banknotes, etc., a maintenance mode for drawing the drawer unit from the unit body 12 and performing troubleshooting, and the like. The mode key 24 is set to the maintenance mode, the drawer unit is drawn from the unit body 12, and thus the reject box 16 can be attached to/detached from the drawer unit through its side and a banknote jam, etc., can be removed.

**[0044]** The collection cassette 17 is drawable forward in relation to the unit body 12 and automatically locked/unlocked by a locking mechanism (not shown) with the cassette 17 attached to the unit body 12. The collection cassette 17 is usually locked to the unit body 12, and the collection cassette 17 can be unlocked and drawn when being filled with banknotes to be collected in collecting in the management mode or when collection of banknotes is finished.

**[0045]** The operation unit 15 is disposed behind the depositing unit 13 on an upper face of the unit body 12, and various operation buttons 15a and a display unit 15b are provided in the operation unit 15.

**[0046]** Additionally, as shown in Figs. 1 and 3, an inlet portion 27 having a bottom portion 25 and both side portions 26 erect fromboth sides of the bottomportion 25 is formed in the depositing unit 13, a front face and upper face of the inlet portion 27 are opened, and banknotes can be put in the portion 27 in a longitudinal direction of a banknote that is a putting-in direction.

**[0047]** An upper face guide 28 facing an upper part of the bottom portion 25 is disposed at an entrance portion of the transport unit 18 connected to the inlet 13a. An interval between the upper face guide 28 and bottom portion 25 in a put-in banknote thickness direction is formed widely, on the inlet 13a side of the upper face guide 28, so that a plurality of banknotes can be put in collectively, and is formed narrowly on the depth side of the upper face guide 28.

**[0048]** A feeding mechanism 29 for separating and feeding banknotes put in the inlet 13a into the transport unit 18 one by one is disposed near a position where the

interval between the bottom portion 25 and upper face guide 28 in the put-inbanknote thickness direction becomes narrow. The feeding mechanism 29 includes a feeding roller 30 which is disposed on the bottom portion 25 side and feeds the last banknote placed on the bottom portion 25 into the transport unit 18, and a reverse rotation roller 31 which is disposed on the upper face guide 28 side and prevents upper banknotes from being fed together with the last banknote.

**[0049]** A putting-in sensor 32 as a banknote putting-in detecting unit for detecting banknotes put in the inlet 13a is disposed on the depositing unit 13. A tracking sensor 33 as a banknote passage detecting unit for detecting passage of a banknote fed into the transport unit 18 one by one by the feeding mechanism 29 is formed on the transport unit 18.

**[0050]** Additionally, as shown in Figs. 1 and 2, an opening regulating member 37 is attachable to/detachable from the depositing unit 13. An opening size of the inlet 13a in the put-in banknote thickness direction is an opening size for putting banknotes in one by one by attaching the opening regulating member 37 to the depositing unit 13, and is an opening size for putting banknotes in collectively by detaching the opening regulating member 37 from the depositing unit 13. The opening regulating member 37 is formed in a rectangular parallelepiped box shape, and both sides thereof are removably attached, from above, to groove portions 38 formed in the both side portions 26 of the inlet portion 27. The opening regulating member 37 is located at a position of the opening size for putting banknotes in one by one with the opening regulating member 37 attached to the groove units 38 of the inlet portion 27, and an interval between a guide face 39 formed in a lower face of the opening regulating member 37 and the bottom portion 25 corresponds to the opening size for putting banknotes in one by one. A tilt face 40 for guiding put-in banknotes onto the lower side of the guide face 39 is formed at the front side of the guide face 39.

**[0051]** A fixing unit 41 is provided which fixes the opening regulating member 37 to the position of the opening size for putting banknotes in one by one. The fixing unit 41 includes a locking unit 42 capable of fixing the opening regulating member 37 to the position of the opening size for putting banknotes in one by one in relation to the inlet portion 27 on the unit body 12 side, and a keying unit 43 for operating the locking unit 42 into a fixing state and a fixation releasing state.

**[0052]** The locking unit 42 has a locking body 44 disposed at the center of an upper part of the opening regulating member 37. The corresponding keying unit 43 is insertably/detachably inserted into the locking body 44 so that the locking body 44 can be turnably operated between a fixing position and a fixation releasing position. A lever 45 for swinging in accordance with turning operation of the locking body 44 to the fixing position and fixation releasing position is disposed at a position of the locking body 44. Both side fixing members 46 capable of entering/exiting the opening regulating member 37 from its sides are disposed at both sides of the opening regulating member 37, and both sides of the lever 45 are connected to the fixing members 46 through links 47 respectively. A plurality of long holes 49 provided in the fixing members 46 are engaged with a plurality of pins 48 provided on the opening regulating member 37 side, and each fixing member 46 moves with turning of the locking body 44 to the fixing position and fixation releasing position and can be slid between a fixing position where the fixing member 46 projects from the side of the opening regulating member 37 and a fixation releasing position where the fixing member 46 retracts into the side of the opening regulating member 37.

**[0053]** The keying unit 43 is used by an operator, manager or the like having authorization for putting banknotes in collectively.

**[0054]** Additionally, fixing grooves 50, into/from the fixing members 46 entering/exiting the opening regulating member 37 from its both sides can advance/retreat, are formed at the position of the opening size for putting banknotes in one by one, where both the sides of the opening regulating member 37 are fitted in the groove portions 38, in inner walls of the groove portions 38 at both sides of the inlet portion 27.

**[0055]** Additionally, an opening regulating member position detecting unit (not shown) is provided which detects that the opening regulating member 37 is located at the position of the opening size for putting banknotes in one by one.

**[0056]** Additionally, as shown in Fig. 6, the following units are connected to the controlling unit 21: the storing portion 20 including a mechanism for storing banknotes, etc. , the transport unit 18 including a transporting mechanism; the recognition unit 19 for recognizing banknotes; the operation unit 15 including a switch to be push-down-operated, etc., the depositing unit 13 including the feeding mechanism, sensors 32 and 33, etc., the dispensing unit 14 including a mechanism for dispensing banknotes, a sensor for detecting dispensed banknotes, etc., a reject unit 53 including a mechanism for detecting attachment of the reject box 16, a mechanism for feeding rejected banknotes to the reject box 16, etc., and a collecting unit 54 including a mechanism for detecting attachment of the collection cassette 17, a mechanism for feeding banknotes to be collected to the collection cassette 17, and the controlling unit 21 controls the whole banknote processing machine 11 including these units.

**[0057]** When it is checked that an operator has no authorization for putting banknotes in collectively by the authorization checking unit 23 for checking whether an operator has authorization for putting banknotes in collectively, the controlling unit 21 operates the feeding mechanism 29 (see Fig. 3) if the opening regulating member position detecting unit (not shown) detects the opening regulating member 37, and does not operate the feeding mechanism 29 (see Fig. 3) if the opening regulating member position detecting unit (not shown) does not detect

the opening regulating member 37.

**[0058]** Next, operation of the banknote processing machine 11 of the embodiment will be described.

**[0059]** Basic operation of the banknote processing machine 11 will be first described with reference to Fig. 5.

**[0060]** In depositing, when the putting-in sensor 32 detects banknotes are put in the depositing unit 13, the feeding mechanism 29 (see Fig. 3) is operated by the controlling unit 21 to separate and feed the banknotes put in the depositing unit 13 to the transport unit 18 one by one, and the banknotes in the transport unit 18 are transported.

**[0061]** The banknotes transported in the transport unit 18 are recognized by the recognition unit 19. By the controlling unit 21, a banknote recognized as a normal banknote is stored in the storing portion 20 corresponding to the denomination of the banknote, and a banknote recognized as a rejected banknote is transported to the dispensing unit 14 and returned.

**[0062]** Data of the depositing amount recognized by the recognition unit 19 is transmitted to the higher-ranking machine 22.

**[0063]** In dispensing, by the controlling unit 21, banknotes to be dispensed based on a dispensing instruction from the higher-ranking machine 22 are fed from the storing portion 20 to the transport unit 18 one by one and recognized by the recognition unit 19, a banknote recognized as a normal banknote is transported to the dispensing unit 14, and a banknote recognized as a rejected banknote is transported to the reject box 16 and collected.

**[0064]** In replenishing, when the putting-in sensor 32 detects banknotes are put in the depositing unit 13, the feeding mechanism 29 is operated by the controlling unit 21 to separate and feed the banknotes put in the depositing unit 13 to the transport unit 18 one by one, and the banknotes in the transport unit 18 are transported.

**[0065]** The banknotes transported in the transport unit 18 are recognized by the recognition unit 19. By the controlling unit 21, a banknote recognized as a normal banknote is stored in the storing portion 20 corresponding to the denomination of the banknote, and a banknote recognized as a rejected banknote is transported to the dispensing unit 14 and returned.

**[0066]** By the controlling unit 21, data of the replenishment amount recognized by the recognition unit 19 is transmitted to the higher-ranking machine 22.

**[0067]** In collecting, based on a collecting instruction from the higher-ranking machine 22, all banknotes stored in the storing portion 20 are transported and shifted to the collection cassette 17 by the controlling unit 21.

**[0068]** Next, operation for each banknote putting-in mode will be described.

**[0069]** As shown in Fig. 1(b), when an operator unused to the operation (an operator having no authorization for putting banknotes in collectively) uses the banknote processing machine 11, a banknote putting-in one by one mode is adopted. In the banknotes putting-in one by one mode, the opening regulating member 37 is fitted into the groove portions 38 of the inlet portion 27, the locking body 44 is turned to the fixing position, the both side fixing members 46 enter the fixing grooves 50 of the groove portions 38 of the inlet portion 27, and the opening regulating member 37 is fixed to the inlet portion 27. In this fixed state, the opening regulating member 37 is located at the position of the opening size for putting banknotes in one by one, the interval between the guide face 39 of the lower face of the opening regulating member 37 and the bottom portion 25 corresponds to the opening size for putting banknotes in one by one.

**[0070]** Thus, the operator unused to the operation puts banknotes in the inlet 13a one by one, banknotes are prevented from being put in collectively, and a banknote jam in the feeding mechanism 29 or transport unit 18 can be reduced.

**[0071]** In the banknote putting-in one by one mode, since the operator unused to the operation does not have the keying unit 43, the mode cannot be changed to a banknote putting-in collectively mode and the banknote putting-in one by one mode is reliably kept.

**[0072]** Additionally, as shown in Fig. 1(a), an operator having authorization for putting banknotes in collectively inserts the owned keying unit 43 into the locking body 44 of the opening regulating member 37 and turn-operates the locking body 44 from the fixing position to the fixation releasing position when putting in a plurality of banknotes for replenishment. The both side fixing members 46 are detached from the fixing grooves 50 of the groove portions 38 of the inlet portion 27 in accordance with this operation, and fixation of the opening regulating member 37 is released. The released opening regulating member 37 is taken out from the inlet portion 27, and thus the opening size of the inlet 13a in the put-in banknote thickness direction is the opening size for putting banknotes in collectively.

**[0073]** Therefore, the operator having authorization for putting banknotes in collectively can collectively put a plurality of banknotes in the inlet 13a. Then, in the banknote processing machine 11, by the controlling unit 21, a replenishment process for separating and taking in banknotes put in the inlet 13a one by one is automatically performed until the putting-in sensor 32 does not detect the banknotes put in the inlet 13a. The operator can perform other work parallel with the replenishment process, and efficiency in banknote replenishment can be improved.

**[0074]** Since the opening regulating member 37 for setting the opening size of the inlet 13a in the put-in banknote thickness direction to the opening size for putting banknotes in one by one and opening size for putting banknotes in collectively can be thus fixed to the position of the opening size for putting banknotes in one by one by the fixing member 46, setting of the position of the opening regulating member 37 to the position of the opening size for putting banknotes in collectively can be reliably regulated. Thus, in the case of an operator unused to the operation, the banknote putting-in one by one mode

is adopted and a banknote jam in depositing can be reduced, in the case of an operator having authorization for putting banknotes in collectively for performing banknote replenishment, the banknote putting-in collectively mode is adopted and the efficiency in banknote replenishment can be improved.

**[0075]** Additionally, authorization of an operator can be pre-checked by the authorization checking unit 23 before the operator operates the banknote processing machine 11.

**[0076]** When it is checked that an operator has no authorization for putting banknotes in collectively, if the opening regulating member position detecting unit (not shown) detects the opening regulating member 37, the feeding mechanism 29 is operated to feed one banknote to the transport unit 18, and if the opening regulating member position detecting unit (not shown) does not detect the opening regulating member 37, for example, due to the fact that the operator forgets to attach the opening regulating member 37 to the inlet portion 27 after the replenishment process, the feeding mechanism 29 is not operated and a banknote jam due to putting banknotes in collectively can be prevented.

**[0077]** When it is checked that an operator has authorization for putting banknotes in collectively, even if the opening regulating member position detecting unit (not shown) does not detect the opening regulating member 37, the feeding mechanism 29 is operated until the putting-in sensor 32 does not detect banknotes put in the inlet 13a.

**[0078]** A second embodiment is shown in Fig. 7.

**[0079]** In the second embodiment, the opening regulating member 37 is, swingably in relation to the inlet portion 27, provided between the position of the opening size for putting banknotes in one by one and the position of the opening size for putting banknotes in collectively.

**[0080]** By this constitution, the same effect as that of the first embodiment can be obtained, and further it can be easily checked which is adopted, the banknote putting-in one by one mode or banknote putting-in collectively mode, and furthermore, damage and loss due to dropping of the opening regulating member 37 can be prevented since the opening regulating member 37 is not detached from the inlet portion 27.

**[0081]** A third embodiment is shown in Fig. 8.

**[0082]** In the third embodiment, similar to the second embodiment, an opening regulating member 37 is, swingably in relation to the inlet portion 27, provided between the position of the opening size for putting banknotes in one by one and the position of the opening size for putting banknotes in collectively.

**[0083]** The opening regulating member 37 has an approximately L-shaped cross section. One end thereof is pivotally supported by a shaft 61 so that the member 37 is swingable in relation to the inlet portion 27. The other end thereof can enter/exit the inlet 13a from above. The opening size of the inlet 13a in the put-in banknote thickness direction can be set to the opening size for putting banknotes in one by one and the opening size for putting banknotes in collectively. A tilt face 62 is formed at the other end of the opening regulating member 37, the tilt face 62 guiding put-in banknotes to a space between the opening regulating member 37 and bottom portion 25 when the opening regulating member 37 is located at the position of the opening size for putting banknotes in one by one.

**[0084]** The opening regulating member 37 is biased to the upper position of the opening size for putting banknotes in collectively for opening the inlet 13a by a twist spring 63 as a biasing unit attached to the shaft 61.

**[0085]** The fixing unit 41 includes a solenoid 64 as a driving unit and a fixing member 65 such as a rod for fixing the opening regulating member 37 to the position of the opening size for putting banknotes in one by one in accordance with action of the solenoid 64. When the solenoid 64 is turned off, the fixing member 65 projects to a fixing position, where the opening regulating member 37 is fixed to the position of the opening size for putting banknotes in one by one, by biasing of a spring 66 as a biasing unit. When the solenoid 64 is turned on, the fixing member 65 retreats to a fixation releasing position, where fixation of the opening regulating member 37 is released, against the biasing of the spring 66. Moreover, a fixing hole, with which the fixing member 65 is engaged at the position of the opening size for putting banknotes in one by one, is provided in the opening regulating member 37.

**[0086]** Additionally, the controlling unit 21 releases the fixation of the opening regulating member 37 and can set the position of the opening regulating member 37 to the position of the opening size for putting banknotes in collectively when it is checked an operator has authorization for putting banknotes in collectively by the authorization checking unit 23 for checking whether an operator has authorization for putting banknotes in collectively.

**[0087]** When authorization of an operator is checked and the operator is checked as an operator having no authorization for putting banknotes in collectively by the authorization checking unit 23, a state, where the banknote putting-in one by one mode is pre-adopted, is kept by the controlling unit 21 as shown in Fig. 8(a). In the banknote putting-in one by one mode, the solenoid 64 is turned off, and the fixing member 65 is, by the biasing of the spring 66, in a state of fixing the opening regulating member 37 to the position of the opening size for putting banknotes in one by one. Thus, the operator having no authorization for putting banknotes in collectively cannot open the opening regulating member 37 fixed to the position of the opening size for putting banknotes in one by one and cannot change the banknote putting-in one by one mode to the banknote putting-in collectively mode, and the banknote putting-in one by one mode is reliably kept.

**[0088]** Additionally, when authorization of an operator is checked and the operator is checked as an operator having authorization for putting banknotes in collectively by the authorization checking unit 23, the solenoid 64 is

temporarily turned on, the fixing member 65 is detached from the opening regulating member 37 to release the fixation of the opening regulating member 37, by the controlling unit 21, as shown in Fig. 8(b). Thus, the opening regulating member 37 is automatically opened to the upper positionof the opening size for putting banknotes in collectively by biasing of the twist spring 63. Therefore, the operator having authorization for putting banknotes in collectively can collectively put a plurality of banknotes in the inlet 13a without opening the opening regulating member 37. Moreover, when it is checked that an operator has authorization for putting banknotes in collectively, the solenoid 64 may be automatically turned on, or may be turned on based on an instruction on collectively putting-in by operation of the operation unit 15. When the operation unit 15 is operated, the solenoid 64 is turned on based on an instruction from the higher-ranking machine 22 by selecting, for example, an item of putting banknotes in collectively for replenishment, etc., or an item of directly opening the opening regulating member 37 with the operation unit 15.

**[0089]** When the solenoid 64 is temporarily turned on and then turned off, the fixing member 65 projects to the opening regulating member 37 by the biasing of the spring 66.

**[0090]** An operator having authorization for putting banknotes in collectively returns the opening regulating member 37 to the lower position of the opening size for putting banknotes in one by one manually after the banknote replenishment process. When the opening regulating member 37 is moved to the position of the opening size for putting banknotes in one by one, the fixing member 65 is engaged and fixed with the opening regulating member 37 by the biasing of the spring 66.

**[0091]** As described above, when it is checked that an operator has authorization for putting banknotes in collectively, the opening regulating member 37 can be automatically fixed to the position of the opening size for putting banknotes in one by one or fixation of the opening regulating member 37 to the position can be automatically released.

**[0092]** Additionally, also in this case, when it is checked that an operator has no authorization for putting banknotes in collectively, the feeding mechanism 29 is operated and one banknote is fed to the transport unit 18 if the opening regulating member position detecting unit (not shown) detects the opening regulating member 37 which is located at the position of the opening size for putting banknotes in one by one, and the feeding mechanism 29 is not operated and the banknote jam due to putting banknotes in collectively can be prevented if the opening regulating member position detecting unit (not shown) does not detect the opening regulating member 37, for example, due to the fact that the operator forgets to return the opening regulating member 37 to the position of the opening size for putting banknotes in one by one after the replenishment process.

**[0093]** When it is checked that an operator has authorization for putting banknotes in collectively, the feeding mechanism 29 is operated until the putting-in sensor 32 does not detect banknotes put in the inlet 13a, even if the opening regulating member position detecting unit (not shown) does not detect the opening regulating member 37.

**[0094]** Moreover, the released opening regulating member 37 may be opened manually without using the twist spring 63.

**[0095]** A fourth embodiment is shown in Fig. 9.

**[0096]** In the fourth embodiment, an opening regulating member 37 is moved parallel with the put-in banknote thickness direction of the inlet 13a, and thus a position of the opening regulating member 37 can be set to the position of the opening size for putting banknotes in one by one and the position of the opening size for putting banknotes in collectively.

**[0097]** The opening regulating member 37 is formed in a block shape, a guide face 39 constituting the inlet 13a between the guide face 39 and bottom portion 25 is formed in a lower face of the opening regulating member 37, and a tilt face 40 for guiding put-in banknotes onto the lower side of the guide face 39 is formed at the front side of the guide face 39.

**[0098]** A cover 69 is disposed at an upper face of the inlet portion 27, a screw shaft 70 having an axis, which is parallel with the put-in banknote thickness direction by the cover 69 and bottom portion 25, is rotatably disposed, and the opening regulating member 37 is screw-engaged with the screw shaft 70. The screw shaft 70 is forward/reversely rotationally driven by a motor 71 as a driving unit, and the opening regulating member 37 is moved between the position of the opening size for putting banknotes in one by one and the position of the opening size for putting banknotes in collectively through the screw-engagement of the screw shaft 70 and opening regulating member 37.

**[0099]** Additionally, when it is checked that an operator has authorization for putting banknotes in collectively by the authorization checking unit 23 for checking whether an operator has authorization for putting banknotes in collectively, the controlling unit 21 controls a motor 71 to shift the opening regulating member 37 from the position of the opening size for putting banknotes in one by one to the position of the opening size for putting banknotes in collectively.

**[0100]** When authorization of an operator is checked and the operator is checked as an operator having no authorization for putting banknotes in collectively by the authorization checking unit 23, a state, where the banknote putting-in one by one mode is pre-adopted, is kept by the controlling unit 21 as shown in Fig. 9(a). In the banknote putting-in one by one mode, the motor 71 is turned off, and the opening regulating member 37 is fixed to the position of the opening size for putting banknotes in one by one. Thus, the operator having no authorization for putting banknotes in collectively cannot move the opening regulating member 37 fixed to the position of the

opening size for putting banknotes in one by one upward and cannot change the banknote putting-in one by one mode to the banknote putting-in collectively mode, and the banknote putting-in one by one mode is reliably kept.

**[0101]** Additionally, when authorization of an operator is checked and the operator is checked as an operator having authorization for putting banknotes in collectively by the authorization checking unit 23, the motor 71 is driven and the opening regulating member 37 is automatically moved to the upper position of the opening size for putting banknotes in collectively by the controlling unit 21, as shown in Fig. 9(b). Therefore, the operator having authorization for putting banknotes in collectively can collectively put a plurality of banknotes in the inlet 13a without operation of, for example, opening the opening regulating member 37. Moreover, when it is checked that an operator has authorization for putting banknotes in collectively, the motor 71 may be automatically driven, or may be driven based on an instruction of putting-in collectively by operation of the operation unit 15. When the operation unit 15 is operated, the motor 71 is driven based on an instruction from the higher-ranking machine 22 and the opening regulating member 37 is raised by selecting, for example, an item of putting-in collectively for banknote replenishment, etc., or an item of directly opening the opening regulating member 37 by the operation unit 15.

**[0102]** Additionally, when authorization of an operator is checked and the operator is checked as an operator having no authorization for putting banknotes in collectively by the authorization checking unit 23, the motor 71 is driven and the opening regulating member 37 is automatically moved to the lower position of the opening size for putting banknotes in one by one, by the controlling unit 21, as shown in Fig. 9(a). Thus, in the case of an operator having no authorization for putting banknotes in collectively, the banknote putting-in one by one mode is reliably automatically adopted.

**[0103]** As described above, when it is checked that an operator has authorization for putting banknotes in collectively, the opening regulating member 37 can be automatically moved to the positionof the opening size forputtingbanknotes in collectively, and when it is checked that an operator has no authorization for putting banknotes in collectively, the opening regulating member 37 can be automatically moved and fixed to the position of the opening size for putting banknotes in one by one.

**[0104]** A fifth embodiment is shown in Fig. 10.

**[0105]** In the fifth embodiment, the controlling unit 21 performs control in accordance with the banknote putting-in collectively mode or banknote putting-in one by one mode in the mechanism of the fourth embodiment shown in Fig. 9.

**[0106]** The opening regulating member 37 and the putting-in sensor 32 for detecting banknotes put in the inlet 13a are disposed on the depositing unit 13. The feeding mechanism 29 for feeding banknotes put in the inlet 13a into the transport unit 18 one by one and the tracking sensor 33 for detecting passage of a banknote fed into the transport unit 18 one by one by the feeding mechanism 29 are disposed on the transport unit 18.

**[0107]** When it is checked that an operator has authorization for putting banknotes in collectively by the authorization checking unit 23 for checking whether an operator has authorization for putting banknotes in collectively, the controlling unit 21 operates the feeding mechanism 29 until the putting-in sensor 32 detects no banknote. When it is checked that an operator has no authorization for putting banknotes in collectively, the controlling unit 21 operates the feeding mechanism 29, then stops the feeding mechanism 29 if the tracking sensor 33 detects passage of one banknote, and thereafter operates the feeding mechanism 29 if the putting-in sensor 32 re-detectsabanknoteafterbanknote detection is stopped.

**[0108]** That is, in the case where it is checked that an operator has authorization for putting banknotes in collectively by the authorization checking unit 23, when the putting-in sensor 32 detects banknotes are put in the inlet 13a, the feeding mechanism 29 is operated to feed banknotes put in the inlet 13a to the transport unit 18 one by one, and continuously operated until the putting-in sensor 32 detects no banknote. Thus, in the case of an operator used to the operation of banknote replenishment and having authorization for putting banknotes in collectively, the banknote putting-in collectively mode is adopted and the efficiency in banknote replenishment can be improved.

**[0109]** In the case where it is checked that an operator has no authorization for putting banknotes in collectively by the authorization checking unit 23, the feeding mechanism 29 is operated when the putting-in sensor 32 detects banknotes put in the inlet 13a, and temporarily stopped when the tracking sensor 33 detects passage of one banknote. Thus, in the case of an operator unused to the operation and having no authorization for putting banknotes in collectively, the banknote jam in depositing can be reliably reduced, because the banknote putting-in one by one mode is mechanically adopted by movement of the opening regulating member 37 to the position of the opening size for putting banknotes in one by one and further controlledly adopted since only one banknote is fed to the transport unit 18 even if a plurality of banknotes are collectively put in the inlet 13a.

**[0110]** Since the controlling unit 21 temporarily stops operation of the feeding mechanism 29 when the tracking sensor 33 on the transport unit 18 detects passage of one banknote, and then operates the feeding mechanism 29 as described above if the putting-in sensor 32 detects a banknote re-put in the inlet 13a by an operator after the operator has taken out banknotes remaining in the inlet 13a and the putting-in sensor 32 has detected no banknote, one banknote can be further fed to the transport unit 18 by re-putting-in a banknote.

**[0111]** Moreover, such control of the controlling unit 21 in accordance with the banknote putting-in collectively mode and banknote putting-in one by one mode can be

applied not only to the constitution of the fourth embodiment but also to each constitution of the first to third embodiments, and the same effect can be obtained.

**[0112]** The banknote putting-in one by one mode is mechanically and controlledly adopted and the banknote jam in depositing can be reliably reduced by applying such control of the controlling unit 21 in accordance with the banknote putting-in collectively mode and banknote putting-in one by one mode to the constitution including the opening regulating member 37 of each above embodiment. However, even if such control is applied to a constitution not including the opening regulating member 37, the banknote putting-in one by one mode is adopted and the banknote jam in depositing can be reduced.

**[0113]** Figs. 11 and 12 show a sixth embodiment.

**[0114]** The bottom portion 25 of the inlet portion 27 is tilted upward to the front of the inlet 13a, a plurality of groove portions 81 are juxtaposed at a front end of the bottom portion 25 in a width direction of the inlet 13a, and a tilt face 82 tilted downward forward is formed at a bottom of each groove unit 81.

**[0115]** An opening regulating member 37 is disposed opposite the bottom portion 25 of the inlet portion 27, and a front end of the opening regulating member 37 is arranged above a portion between a rear end and front end of the tilt face 82.

**[0116]** By this constitution, even if liquid is dropped onto the inlet portion 27, the liquid dropped onto or in front of the opening regulating member 37 is dropped onto the tilt faces 82 to be discharged forward, and can be prevented from entering the inlet 13a. Thus, a bad influence on the feeding mechanism 29, transporting mechanism of the transport unit 18, etc., due to entrance of liquid to the inlet 13a can be prevented.

**[0117]** Moreover, the opening regulating member 37 of each of the second to fourth embodiments can be turned or moved in an up and down direction. Additionally, the bottom portion 25 of the inlet portion 27 may not only be tilted upward to the front of the inlet 13a but made horizontal.

**[0118]** Although the authorization checking unit 23 is a single unit and connected to the higher-ranking machine 22 as shown in Fig. 5, it may be built in the higher-ranking machine 22, may be a single unit and connected to both the higher-ranking machine 22 and banknote processing machine 11, or may be built in the banknote processing machine 11.

**[0119]** Although the operation unit 15 is provided in the banknote processing machine 11, it may be provided in the higher-ranking machine 22, may be provided separately from the banknote processing machine 11 and higher-ranking machine 22 and connected to the banknote processing machine 11 or higher-ranking machine 22.

Industrial Applicability

**[0120]** The present invention is applied not only to a self-registration system with which a customer performs commodity registration and adjustment, a self-settlement system with which a customer performs adjustment and a cash register, but also to a banknote processing machine having a banknote depositing function, etc.

## Claims

1. A banknote processing machine comprising:

   an inlet in which a plurality of banknotes can be put collectively;
   an opening regulating member for setting an opening size of the inlet in a put-in banknote thickness direction to an opening size for putting banknotes in one by one and an opening size for putting banknotes in collectively at the least; and
   a fixing unit capable of fixing the opening regulating member to a position of the opening size for putting banknotes in one by one at the least.

2. The banknote processing machine according to claim 1,
   wherein the fixing unit includes a locking unit capable of fixing the opening regulating member to the position of the opening size for putting banknotes in one by one at the least, and a keying unit for operating the locking unit into a fixing state and a fixation releasing state.

3. The banknote processing machine according to claim 1,
   wherein the fixing unit releases fixation of the opening regulating member and can set a position of the opening regulating member to a position of the opening size for putting banknotes in collectively when it is checked that an operator has authorization for putting banknotes in collectively by an authorization checking unit for checking whether an operator has authorization for putting banknotes in collectively.

4. The banknote processing machine according to claim 1,
   wherein the fixing unit releases fixation of the opening regulating member and can set a position of the opening regulating member to a position of the opening size for putting banknotes in collectively when an operation unit for issuing an instruction of putting banknotes in collectively is operated after it has been checked that an operator has authorization for putting banknotes in collectively by an authorization checking unit for checking whether an operator has authorization for putting banknotes in collectively.

5. The banknote processing machine according to claim 3 or 4,

wherein the opening regulating member is movably provided between the position of the opening size for putting banknotes in one by one and the position of the opening size for putting banknotes in collectively, and
the fixing unit includes a fixing member capable of fixing the opening regulating member to the position of the opening size for putting banknotes in one by one, and a driving unit for moving the fixing member to a fixing position and a fixation releasing position of the opening regulating member.

**6.** The banknote processing machine according to claim 2 or 5, comprising:

a feeding mechanism for separating and feeding banknotes put in the inlet to a transport unit one by one;
an opening regulating member position detecting unit for detecting that the opening regulating member is located at the position of the opening size for putting banknotes in one by one; and
a controlling unit which, when it is checked that an operator has no authorization for putting banknotes in collectively by an authorization checking unit for checking whether an operator has authorization for putting banknotes in collectively, operates the feeding mechanism if the opening regulating member position detecting unit detects the opening regulating member, and does not operate the feeding mechanism if the opening regulating member position detecting unit does not detect the opening regulating member.

**7.** The banknote processing machine according to claim 3 or 4, further comprising a controlling unit which controls the driving unit so as to move the opening regulating member to the position of the opening size for putting banknotes in one by one and the position of the opening size for putting banknotes in collectively at the least,
wherein the opening regulating member is movable in a put-in banknote thickness direction of the inlet, and
the fixing unit includes a driving unit for moving the opening regulating member in the put-in banknote thickness direction of the inlet.

**8.** The banknote processing machine according to claim 1, comprising:

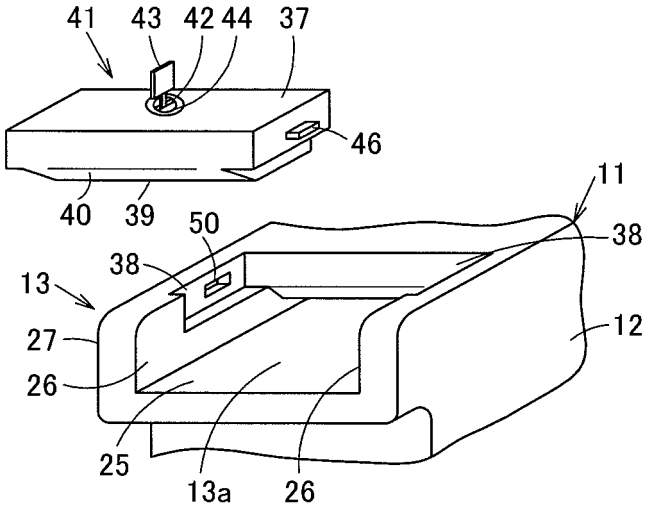
a banknote putting-in detecting unit for detecting banknotes put in the inlet;
a feeding mechanism for separating and feeding banknotes put in the inlet to a transport unit one by one;
a banknote passage detecting unit for detecting passage of a banknote fed to the transport unit by the feeding mechanism; and
a controlling unit which operates the feeding mechanism until the banknote putting-in detecting unit detects no banknote in the case where it is checked that an operator has authorization for putting banknotes in collectively by an authorization checking unit for checking whether an operator has authorization for putting banknotes in collectively, and operates the feeding mechanism and then stops operation of the feeding mechanism when the banknote passage detecting unit detects passage of one banknote in the case where it is checked that an operator has no authorization for putting banknotes in collectively.

**9.** A banknote processing machine comprising:

an inlet in which a plurality of banknotes can be put collectively;
a banknote putting-in detecting unit for detecting banknotes put in the inlet;
a feeding mechanism for separating and feeding banknotes put in the inlet to a transport unit one by one;
a banknote passage detecting unit for detecting passage of a banknote fed to the transport unit by the feeding mechanism; and
a controlling unit which operates the feeding mechanism until the banknote putting-in detecting unit detects no banknote in the case where it is checked that an operator has authorization for putting banknotes in collectively by an authorization checking unit for checking whether an operator has authorization for putting banknotes in collectively, and operates the feeding mechanism and then stops operation of the feeding mechanism when the banknote passage detecting unit detects passage of one banknote in the case where it is checked that an operator has no authorization for putting banknotes in collectively.

**10.** The banknote processing machine according to claim 8 or 9, wherein the controlling unit, in the case where it is checked that an operator has no authorization for putting banknotes in collectively by the authorization checking unit, stops operation of the feeding mechanism when the banknote passage detecting unit detects passage of a banknote, and thereafter operates the feeding mechanism if the banknote putting-in detecting unit re-detects a banknote after banknote detection is stopped.

(a)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(b)

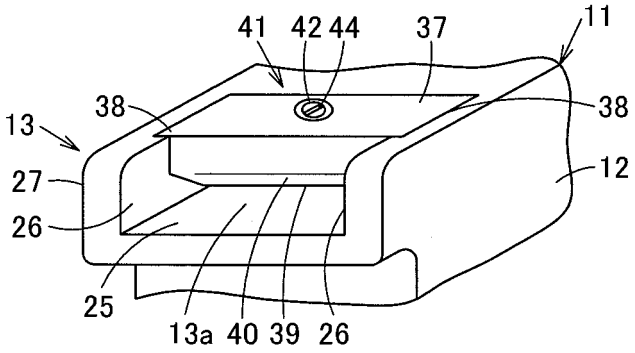
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FIG. 1

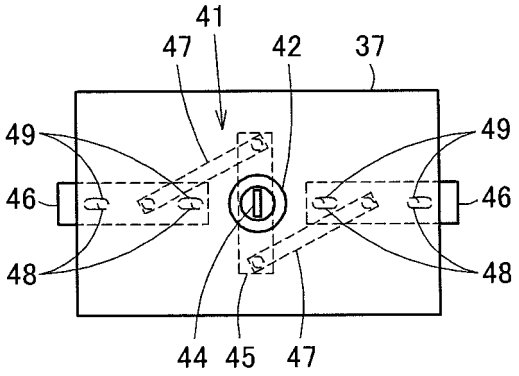
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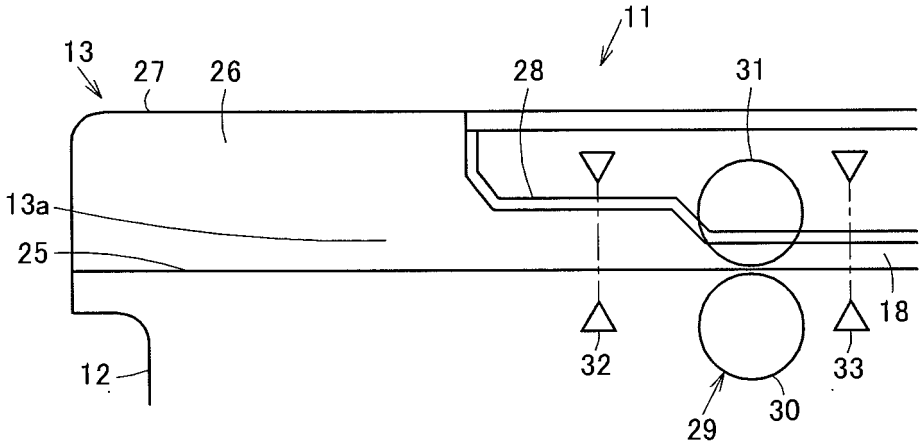
FIG. 2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13a
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FIG. 3

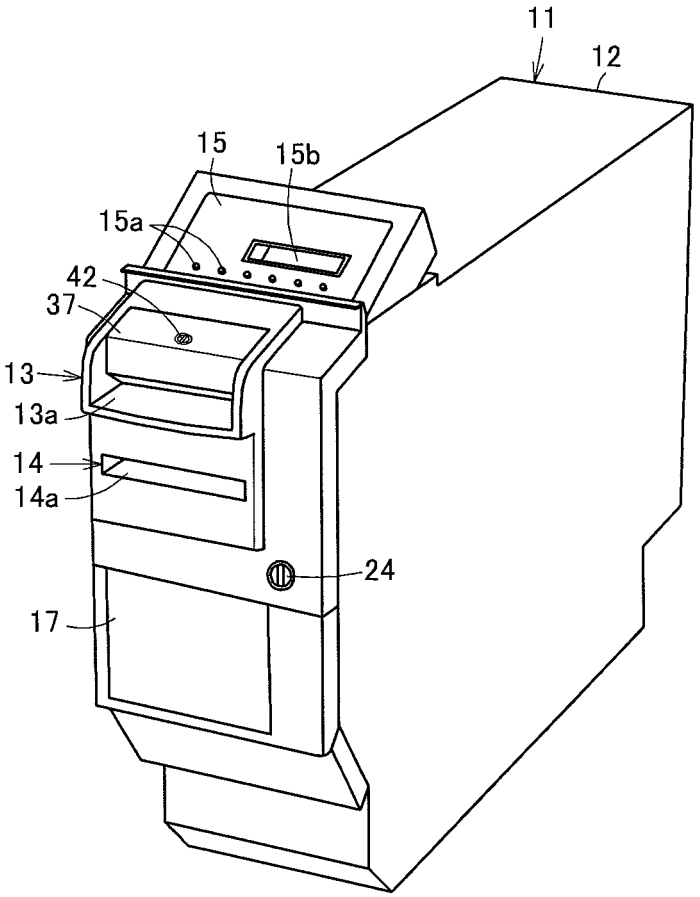



FIG. 4

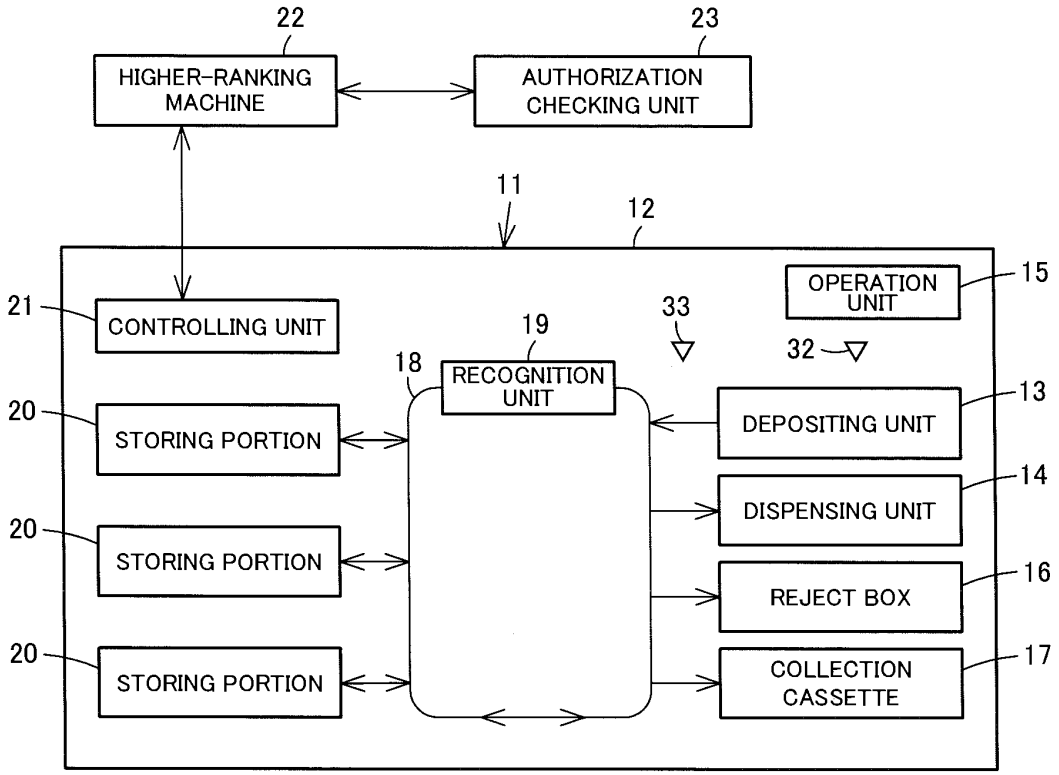
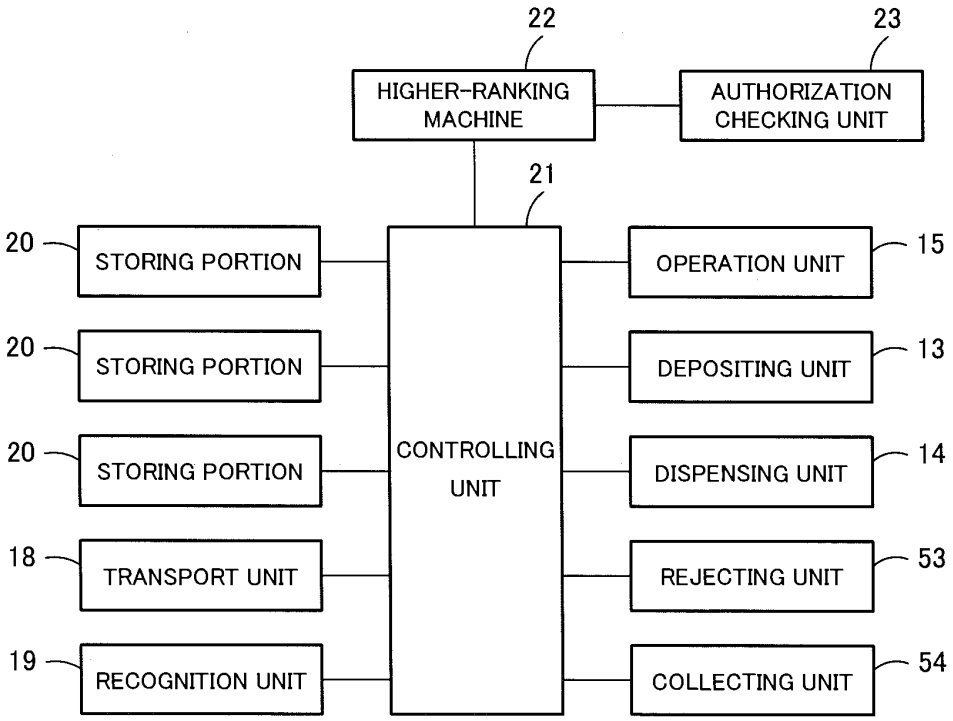

22
23
HIGHER-RANKING MACHINE
AUTHORIZATION CHECKING UNIT
11
12
OPERATION UNIT
15
21
CONTROLLING UNIT
19
33
32
18
RECOGNITION UNIT
20
STORING PORTION
DEPOSITING UNIT
13
20
STORING PORTION
DISPENSING UNIT
14
20
STORING PORTION
REJECT BOX
16
COLLECTION CASSETTE
17

FIG. 5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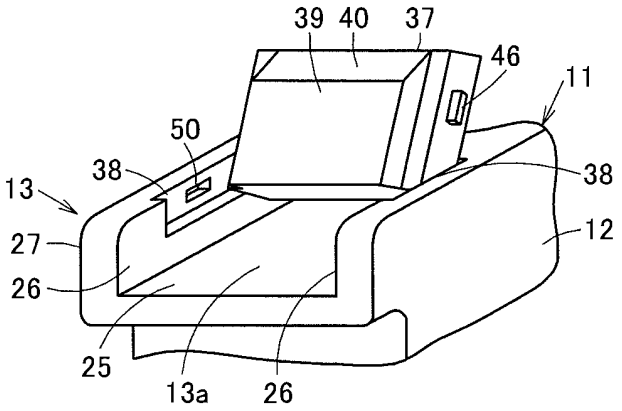
23
HIGHER-RANKING MACHINE
AUTHORIZATION CHECKING UNIT
21
20
STORING PORTION
OPERATION UNIT
15
20
STORING PORTION
DEPOSITING UNIT
13
20
STORING PORTION
CONTROLLING UNIT
DISPENSING UNIT
14
18
TRANSPORT UNIT
REJECTING UNIT
53
19
RECOGNITION UNIT
COLLECTING UNIT
54

FIG. 6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11
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12
27
26
25
13a
26

FIG. 7

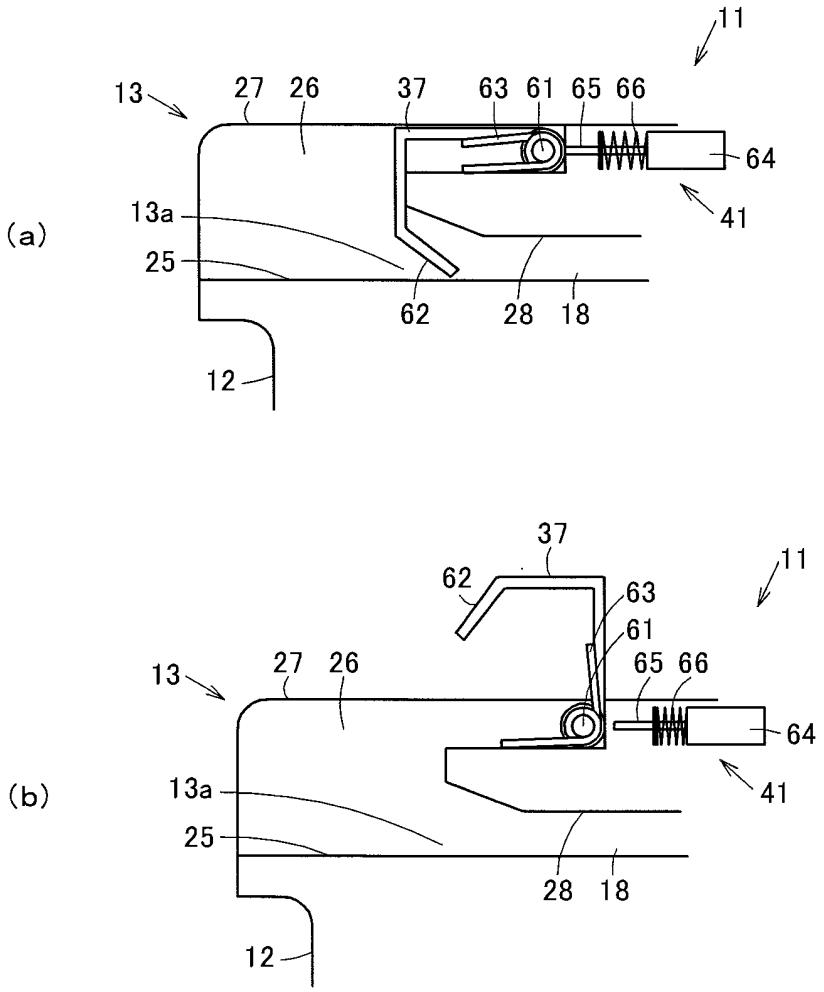
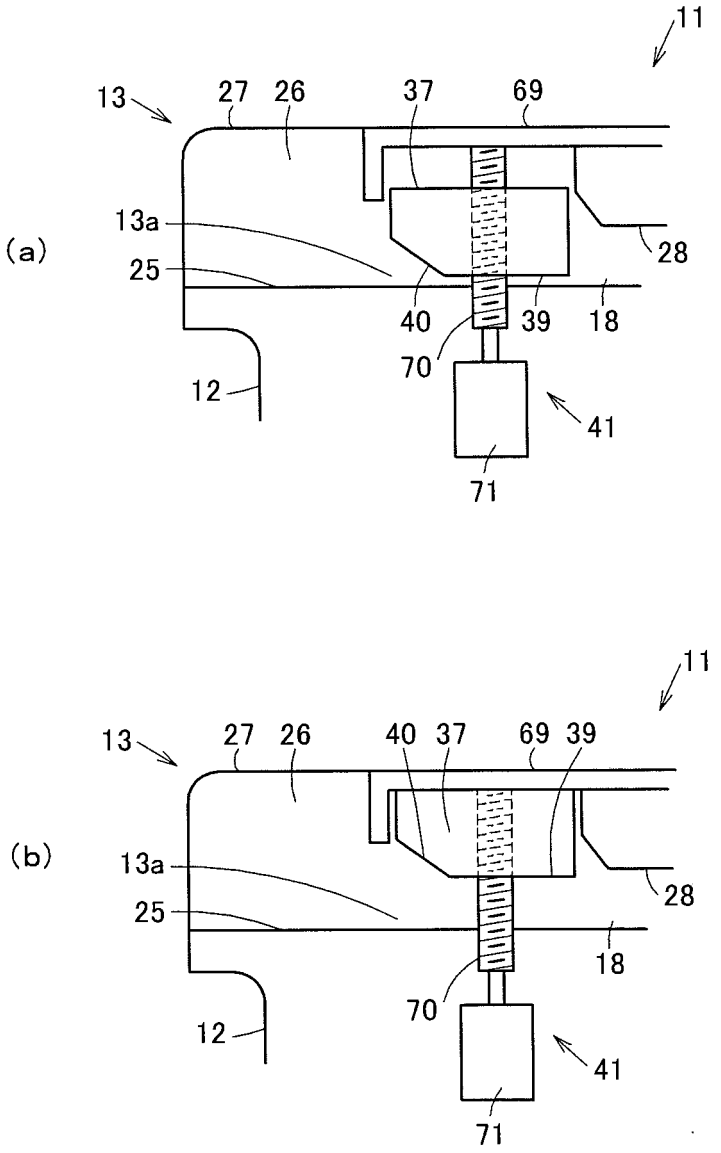

(a)
11
13
27
26
37
63
61
65
66
64
41
13a
25
62
28
18
12
(b)
37
11
62
63
61
13
27
26
65
66
64
41
13a
25
28
18
12

FIG. 8


(a)
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37
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13a
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28
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39
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70
12
41
71
(b)
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13
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26
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37
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39
13a
25
28
18
70
12
41
71

FIG. 9

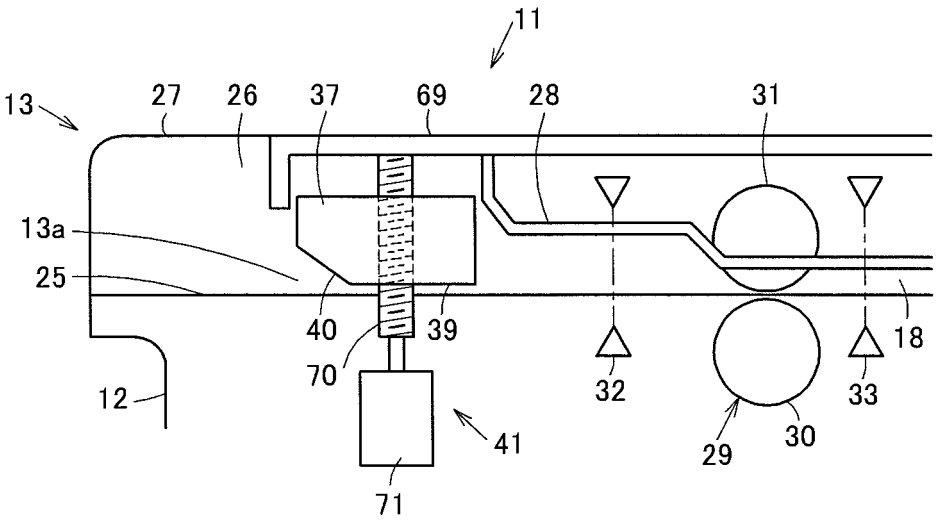


FIG. 10

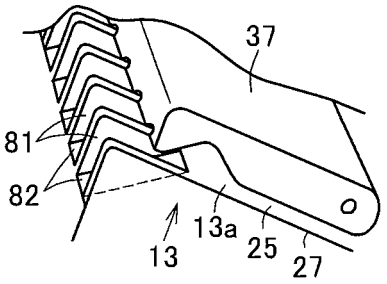


FIG. 11

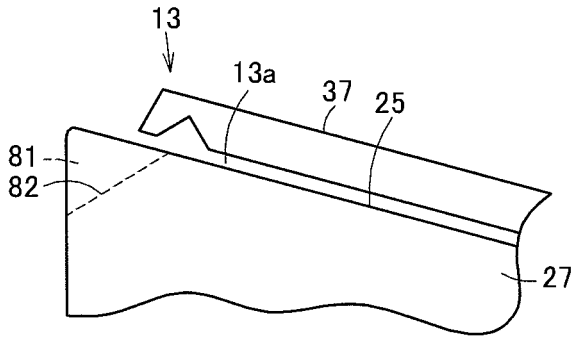


FIG. 12

**INTERNATIONAL SEARCH REPORT**

International application No.
PCT/JP2007/059643

A. CLASSIFICATION OF SUBJECT MATTER
*G07D11/00*(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G07D9/00-13/00, G07F19/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2007
Kokai Jitsuyo Shinan Koho 1971-2007 Toroku Jitsuyo Shinan Koho 1994-2007

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| A | JP 2006-236108 A (Glory Ltd.), 07 September, 2006 (07.09.06), (Family: none) | 1-10 |
| A | JP 2002-145462 A (Japan Cash Machine Co., Ltd.), 22 May, 2002 (22.05.02), & US 2005/0078864 A1 & EP 1302911 A1 & WO 02/07108 A1 | 1-10 |
| A | JP 4-36889 A (Takamisawa Cybernetics Co., Ltd.), 06 February, 1992 (06.02.92), (Family: none) | 1-10 |

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 19 July, 2007 (19.07.07) | 31 July, 2007 (31.07.07) |
| Name and mailing address of the ISA/ Japanese Patent Office<br>Facsimile No. | Authorized officer<br>Telephone No. |

Form PCT/ISA/210 (second sheet) (April 2005)

## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


- JP 10049753 A **[0007]**
- JP 2002032816 A **[0007]**
- JP 2006236108 A **[0007]**