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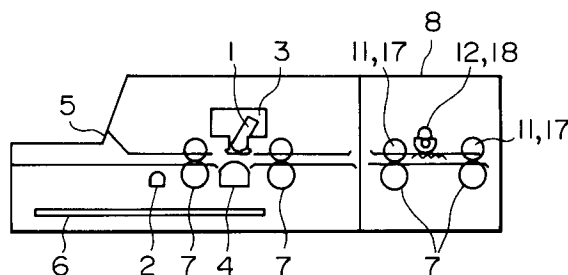
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W-8000 München 22 (DE)(54) **Bankbook printer.**

(57) A bankbook printer has: a conveying device (7) for conveying a bankbook in predetermined directions; a reading device (2) for reading magnetic information, which device is provided near the conveying device (7); an optical device (1) for reading optical information printed in a bankbook which is being handled by the conveying device (7); a printing device (3) for performing printing to a bankbook, which device is provided substantially in the middle of the conveying device (7); a page-turnover unit (8) for turning pages of a bankbook in response to a signal from the optical device (1); a transmission control device for sending/receiving information to/from the magnetic and optical devices (1) and the outside; a storing device for storing information read by the magnetic and optical devices; and a control device (6) for controlling all of the devices described above. Two types of page-turnover units are provided: a page-turnover unit for handling a bankbook with left-to-right turning in which printing is performed perpendicularly to its spine; and a page-turnover unit for a bankbook with top-to-bottom turning in which printing is performed parallel to its spine, and page-turnover units of both types are

detachable from the printer main body. Either one of the page-turnover units is selectively connected to the main body.

FIG. 1

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION:

The present invention relates to bankbook printers which are used in banking facilities and, more particularly, to a low-cost and highly-reliable bankbook printer in which production of or modification to either a bankbook printer for handling bankbooks with left-to-right turning or a bankbook printer for handling bankbooks with top-to-bottom turning can be easily performed by selectively employing either a page-turnover unit for bankbooks with left-to-right turning or a page-turnover unit for bankbooks with top-to-right turning.

DESCRIPTION OF THE RELATED ART:

Conventional bankbook printers which are employed in cash dispensers or operated by clerks of financial agencies automatically turnover pages of bankbooks when necessary in order to print in designated locations in the bankbooks.

Bankbooks handled by such bankbook printers generally fall into two types: a type in which printing is performed perpendicularly to the spine of the book (a bankbook with left-to-right turning); and a type in which printing is performed parallel to the spine of the book (a bankbook with top-to-bottom turning). Most bankbook printers are able to turnover pages of bankbooks of only one of the two types. However, a bankbook printer which is able to handle both types of bankbooks is disclosed by Japanese Patent Application Laid-Open No. 63-9564.

Such a printer for both types of bankbooks generally has a complicated construction, requires high production costs and yet fails to achieve sufficient reliability. Moreover, a financial agency rarely uses both types of bankbooks. Thus, in usual practice, bankbook printers are constructed so as to automatically turnover pages of bankbooks of either of the two types.

However, such construction of bankbook printers causes problems. Because a maker must produce bankbook printers according to the type of bankbooks of a user financial agency, there inevitably is a long time lag between acceptance of an order and shipment of the products. Moreover, if a financial agency changes the bankbooks from one type to another, the agency may have to replace all their bankbook printers.

SUMMARY OF THE INVENTION

The present invention is intended to solve the above problems of the known art. Accordingly, an

object of the present invention is to provide a low-cost and stably-operable bankbook printer which facilitates the production of and modification to either a bankbook printer for handling bankbooks with left-to-right turning or a bankbook printer for handling bankbooks with top-to-bottom turning by employing a page-turnover unit suitable for bankbooks of the desired one of the two types.

To achieve the above object, according to the present invention, there is provided a bankbook printer comprising: conveying means for conveying a bankbook in predetermined directions; reading and writing means for reading and writing magnetic information on a magnetic stripe adhered to a bankbook, optical means for reading optical information printed in a bankbook which is being handled by the conveying means; printing means for performing printing to a bankbook, the printing means being provided substantially in the middle of the conveying means; a page-turnover unit for turning pages of a bankbook in response to a signal from the optical means; transmission control means for sending and receiving information to and from the reading and writing means and optical means and the outside; storing means for storing information read by the reading and writing means and optical means; and control means for controlling all of the means described above, wherein two types of page-turnover units are provided: a page-turnover unit corresponding to a bankbook with left-to-right turning in which printing is performed in a direction perpendicular to the spine thereof; and a page-turnover unit corresponding to a bankbook with top-to-bottom turning in which printing is performed in a direction parallel to the spine thereof and the two types of page-turnover units are detachable from the main body of the bankbook printer, and wherein either one of the two types of page-turning units is selectively connected to the main body of the bankbook printer.

According to the present invention, bankbook printers of the two turnover types can be systematically assembled by using substantially the same means and components except for the page-turnover units and a printing platen portion unit, which are selectively employed in accordance with the designated type of bankbook. Therefore, the overall construction of a bankbook printer is comparatively simple, and a bankbook printer of one type can be easily modified into the other type. Further, in such a bankbook printer the production costs can be reduced, and operational reliability can be increased.

Specifically, a bankbook printer for handling bankbooks with top-to-bottom turning employs a corresponding page-turnover unit as shown in Fig. 4 and platen elevating means as shown in Fig. 2 for raising a bankbook to a certain distance from a

printing head. When printing performed by a printing unit reaches the end of the opened bottom page of a bankbook, the page-turnover unit for bankbooks with top-to-bottom turning turns to the next page, thus enabling the printing unit to continue printing.

A bankbook printer for handling bankbooks with left-to-right turning employs a corresponding page-turnover unit as shown in Fig. 5 and platen elevating means as shown in Fig. 3 for separately pressing right and left pages of a bankbook to a printing head. As described above, when printing performed by a printing unit reaches the end of the currently-opened pages of a bankbook, the page-turnover unit for bankbooks with left-to-right turning turns to the next page, thus enabling the printing unit to continue printing.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic side view of a bankbook printer according to an embodiment of the present invention.

Fig. 2 is a schematic illustration of platen elevating means for a bankbook with top-to-bottom turning, taken from the left side of the bankbook printer shown in Fig. 1.

Fig. 3 is a schematic illustration of platen elevating means for a bankbook with left-to-right turning, taken from the left side of the bankbook printer shown in Fig. 1.

Fig. 4 is a schematic illustration of a page-turnover unit for bankbooks with top-to-bottom turning, taken from above the bankbook printer shown in Fig. 1.

Fig. 5 is a schematic illustration of a page-turnover unit for bankbooks with left-to-right turning, taken from above the bankbook printer shown in Fig. 1.

Fig. 6 is an exploded perspective view of detaching means of a page-turnover unit, according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Embodiments of the present invention will be described hereinafter with reference to the drawings.

Fig. 1 is a side view of a bankbook printer system according to an embodiment of the present invention. Fig. 2 is a schematic illustration of platen elevating means for a bankbook with top-to-bottom turning, taken from the left side of the bankbook printer shown in Fig. 1. Fig. 3 is a schematic illustration of platen elevating means for a bankbook with left-to-right turning, taken from the left side of the bankbook printer shown in Fig.

1. Fig. 4 is a schematic illustration of a page-turnover unit for bankbooks with top-to-bottom turning, taken from above the bankbook printer shown in Fig. 1. Fig. 5 is a schematic illustration of a page-turnover unit for bankbooks with left-to-right turning, taken from above the bankbook printer shown in Fig. 1.

The figures show: an optical sensor 1 serving as means for reading page codes or the like printed in a bankbook; a magnetic head 2 serving as means for reading and writing magnetic information from and into a bankbook; printing head 3 for printing in a bankbook; platens 4, 4a and 4b arranged oppositely facing the printing head 3; bankbook inserting opening 5; a control circuit 6 for controlling the above means 1 through 4b, the control circuit 6 including transmission controlling means for sending and receiving data to and from the above means and the outside and further including storing means for storing data; conveying rollers 7 which are components of conveying means for conveying a bankbook; and a page-turnover unit 8 which is detachable from the main body of the bankbook printer, and which is a main feature of the present invention. The means 1 through 4b are arranged along the conveying means including the conveying rollers 7, as shown in Fig. 1. Other components will be described later when mentioned.

The normal operation of the bankbook printer of the present invention is as follows.

When a bankbook is put in through the inserting opening 5, the magnetic head 2 reads data written in the magnetic stripe portion of the bankbook. If the read-out data is accepted, the bankbook is conveyed by the conveying rollers 7 to a printing unit, where designated printing is performed between the printing head 3 and the platen 4.

In a bankbook printer for bankbooks with top-to-bottom turning, the bankbook is raised by the platen 4a for printing so that every portion of the printing page is located at a certain distance from the printing head 3. As shown in Fig. 2, the platen 4a is elevated by a solenoid 9 which is drawn in to rotate a link 34 about its supporting point so that the link 34 pushes up the platen 4a.

In a bankbook printer for bankbooks with left-to-right turning, a line of printing progresses from the right and left pages across the spine of an opened bankbook whose right and left halves usually have different thicknesses. Therefore, as shown in Fig. 3, the platen 4b is divided into three portions 4b₁, 4b₂ and 4b₃ corresponding to a left page, a spine portion and a right page of a bankbook, respectively. A solenoid 9 is drawn in to push up a platen table 27 by means of a link 34. Thus, the three portions 4b₁, 4b₂ and 4b₃ of the platen

4b are pressed to the printing head 3 by means of springs 10. Such construction makes it possible to evenly place every portion of the printing surface of the bankbook at a certain distance from the printing head 3.

The operation which is performed when printing reaches the end of the opened pages of a bankbook during a printing process will be described.

In such a case, the conveying rollers 7 convey the bankbook to the page-turnover unit 8 which is disposed further inside beyond the printing unit. In a bankbook printer for bankbooks with top-to-bottom turning, the page-turnover unit as shown in Fig. 4 operates a page-turnover motor 15 to rotate a page-turning roller 12. Fig. 4 further shows: conveying rollers 11, and a timing pulley 16a for transmitting driving force from the main body of the bankbook printer to the page-turning unit 8.

In a bankbook printer for bankbooks with left-to-right turning, the page-turnover unit as shown in Fig. 5 operates a page-turning motor 19 to rotate a page-turning roller 18 which is positioned diagonally with respect to the conveying direction of the bankbook placed in an opening 32. Page turnover is performed by the combination of rotation of the page-turning roller 18 and a twisted curve guide surface 20. Fig. 5 further shows: a timing pulley 16b for transmitting driving force from the main body of the bankbook printer to the page-turning unit 8; and a pulley 21 for synchronously rotating various groups of conveying rollers 17.

When page turnover is completed, the bankbook is conveyed back to the printing unit, where the optical sensor 1 reads a page code printed on every page of the bankbook. After it is confirmed that page turnover has been correctly performed, the rest of the printing is performed. When printing is completed, the magnetic head 2 renews information written in the magnetic stripe portion. Then, the bankbook is discharged from the inserting opening 5.

The bankbook printer of the invention operates as described above.

An embodiment of detaching means of the page-turning unit 8 according to the present invention will be described with reference to Fig. 6. Side frames 23a and 23b of the bankbook printer main body has "U"-shape notches 28a and 28b. Side frames 24a and 24b of the page-turnover unit has positioning pins 25a and 25b which are connected into portions thereof corresponding to the "U"-shape notches 28a and 28b, respectively. The side frames 24a and 24b of the page-turnover unit has hooks 27a and 27b in upper portions thereof.

The bankbook printer of this embodiment is assembled as follows. A page-turnover unit for either a bankbook with top-to-bottom turning or a bankbook with left-to-right turning is placed behind the printer main body. Then, the page-turnover unit is positioned with respect to the main body by using the "U"-shape notches 28a and 28b formed in the side frames 23a and 23b of the printer main body and the positioning pins 25a and 25b connected into the side frames 24a and 24b of the page-turnover unit, and hooking the hooks 27a and 27b formed in upper portions of the side frames 24a and 24b of the page-turnover unit onto the side frames 23a and 23b of the printer main body. The page-turnover unit is fastened to the printer main body by screws 26a and 26b. A belt 22 is provided between the conveying rollers of the bankbook printer main body and the conveying rollers of the page-turnover unit in order to allow power transmission.

According to the above-described embodiment, a bankbook printer for either type of bankbook can be easily produced and modified by attaching a corresponding page-turnover unit to the main body of the bankbook printer. Thus, low overall production costs and highly reliable operation of the bankbook printer can be achieved.

It should be understood that the above-described embodiment is merely for illustration of the present invention and does not restrict the present invention. For example, there are many other mechanisms that can be employed in page-turnover units for either type of bankbooks. Further, a bankbook printer main body and a page-turnover unit may be assembled by a method other than the method described above.

As described above, the present invention facilitates the production and modification of bankbook printers for bankbooks with either top-to-bottom or left-to-top turning and thus achieves low overall production costs and highly reliable operation of bankbook printers.

Claims

1. A bankbook printer comprising:
 - conveying means (7) for conveying a bankbook in predetermined directions;
 - reading means (2) for reading magnetic information, said reading means (2) being provided near said conveying means (7);
 - optical means (1) for reading optical information printed in a bankbook which is being handled by said conveying means (7);
 - printing means (3) for performing printing to a bankbook, said printing means (3) being provided substantially in the middle of said conveying means (7);

a page – turnover unit (8) for turning pages of a bankbook in response to a signal from said optical means (1);

transmission control means for sending and receiving information to and from said magnetic means and optical means (1) and the outside;

storing means for storing information read by said magnetic means and optical means (1); and

control means (6) for controlling all of said means described above,

wherein two types of said page – turnover unit (8) are provided: a page – turnover unit (8) corresponding to a bankbook with left – to – right turning in which printing is performed in a direction perpendicular to the spine thereof; and a page – turnover unit corresponding to a bankbook with top – to – bottom turning in which printing is performed in a direction parallel to the spine thereof, and said two types of page – turnover units (8) are detachable from the main body of said bankbook printer, and either one of said two types of page – turnover units is selectively connected to the main body of said bankbook printer.

2. A bankbook printer according to Claim 1, wherein said printing means (3) includes a platen (4,4a,4b) which is detachable so that one type of platen (4,4a,4b) can be selectively replaced by another type of platen (4,4a,4b).

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FIG. 1

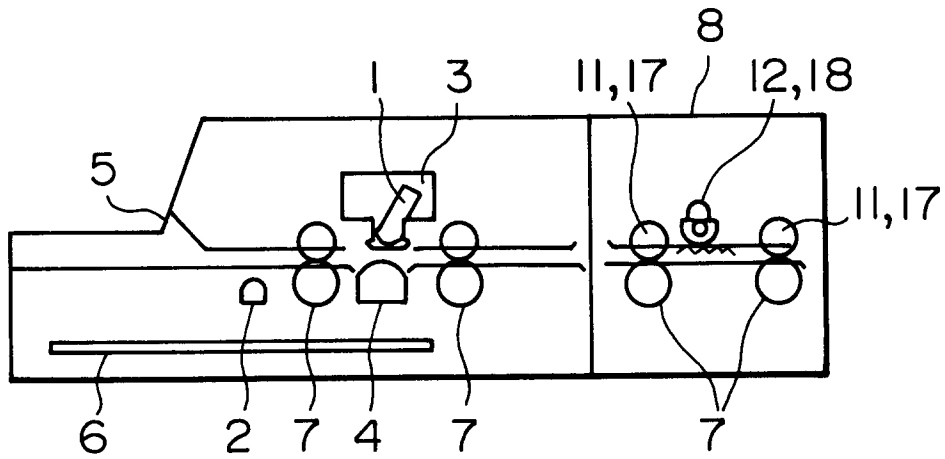


FIG. 2

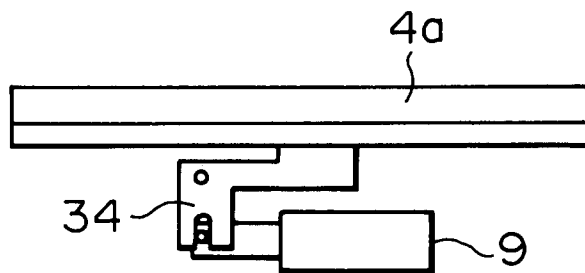


FIG. 3

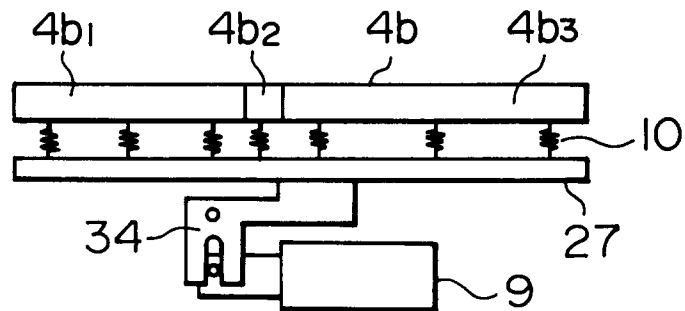


FIG. 4

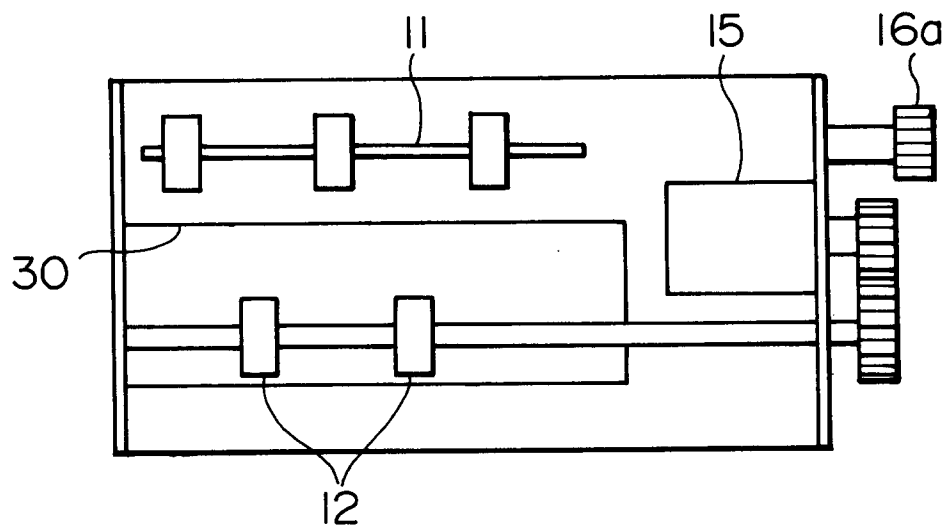


FIG. 5

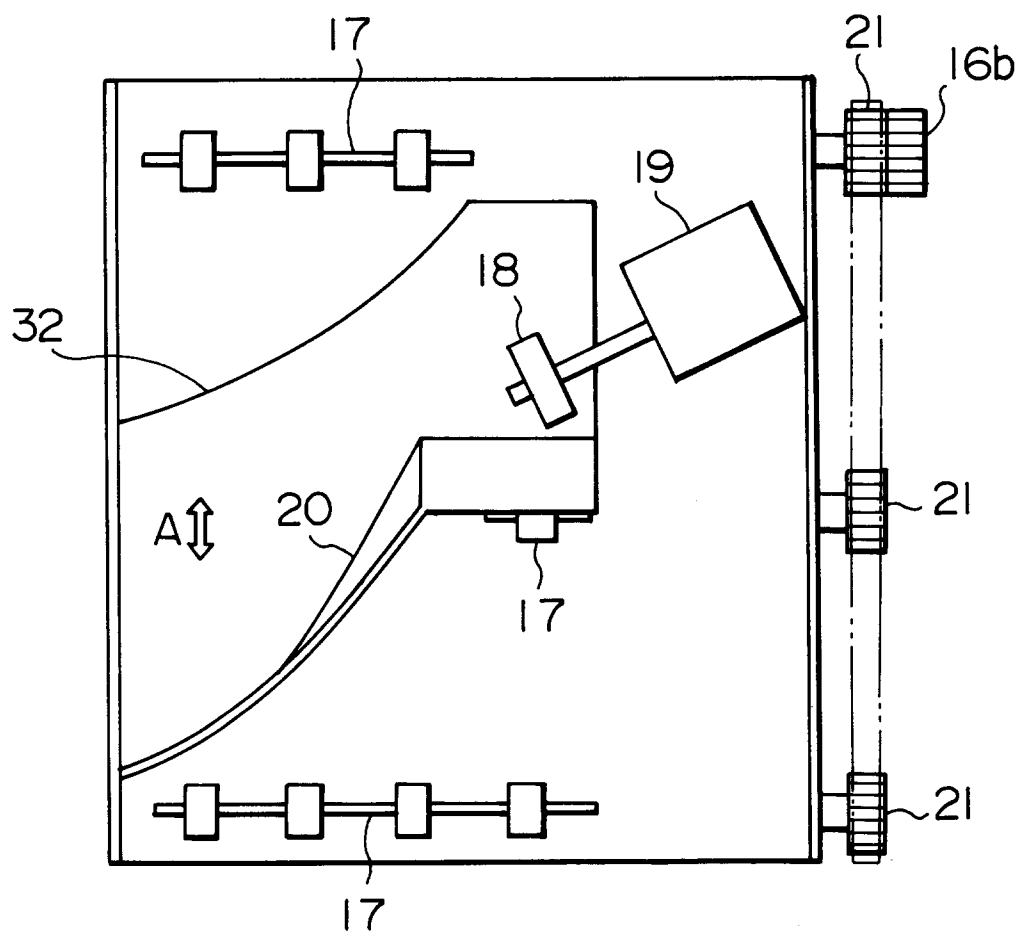


FIG. 6

