

Description

The present invention relates to a printer providing the possibility of selection between cut sheet paper and fan fold paper, and more specifically to the method and the device for feeding the paper.

In a conventional printer adapted to process both, cut sheet paper and fan fold paper, in order to realize an interrupt printing, i.e. an interruption of printing on fan fold paper for temporarily printing on a cut sheet paper, the fan fold paper printing process is stopped and the fan fold paper moved away from the paper feeding path to allow the cut sheet printing. When the cut sheet printing has ended, the fan fold paper is returned to the position it had when the interrupt started, so that the printing of the fan fold paper can start again (JP-A-60-44379).

However, the forward and backward movement of the fan fold paper causes a paper sagging within the paper feeding path, thereby also causing a print displacement.

The document US-A-4,645,365 discloses a paper feed system in a printer including a platen for supporting a paper sheet, a paper feed drive motor and a transmission gear mechanism for transferring the rotation of the paper feed drive motor to the platen so as to conduct an automatic paper feed operation. The known paper feed system further allows a manual paper feed operation wherein the platen is manually rotated. A detection system is provided which detects the manual paper feed operation. If the manual paper feed operation has been conducted before the automatic paper feed operation, a compensating paper drive is first conducted when an automatic paper feed instruction is developed. In the compensating paper drive, the platen is first driven to rotate in the reverse direction by a predetermined amount and, then to rotate in the forward direction by the same amount, thereby compensating for the displacement of the paper sheet location caused by the backlash of the transmission gear mechanism during the manual paper feed operation.

It is an object of the present invention to overcome the above stated problem of the prior art and to provide a method and a device for feeding fan fold paper in a printer, allowing an accurate repositioning of fan fold paper after an interrupt printing.

This object is achieved with a method and a device, respectively, as claimed.

By the repeated forward and backward feeding of the fan fold paper any paper sagging which may occur at the print start or the print restart after an interrupt printing is securely removed and a print displacement after a print restart can be prevented. This ensures a high quality printing.

On way of carrying out the invention is de-

scribed in detail below with reference to drawings which illustrate only one specific embodiment, and in which:

- Fig. 1 is a diagrammatic view of one embodiment of the invention,
- Fig. 2 is a block diagram of one embodiment of the control device,
- Fig. 3 is a flow chart for explaining the operation of the invention, and
- Fig. 4 is a view for explaining the reciprocation of the fan fold paper according to the invention.

In Fig. 1 reference numeral 1 designates a platen, 2 a pushtractor for supplying fan fold paper, 3 a cut sheet feeder for supplying cut sheet paper, 4 a paper guide, 5 a paper pressing member, 6 a printing head and 7 a paper sensor. Tractor 2 and cut sheet feeder 3 are disposed on the upstream side of platen 1 with respect to the paper feeding direction A. Paper supplied by either tractor 2 or cut sheet feeder 3 is guided by paper guide 4 to the paper pressing member 5 to be fed to the printing area. Paper sensor 7 provided on the upstream side of platen 1 with respect to the paper feeding direction A serves to detect a reference position of the fan fold paper. Both, platen 1 and tractor 2, are driven by a common pulse motor 9 through a transmitting mechanism not shown. Pulse motor 9 is controlled by a motor driving circuit 10 which receives control signals from a control device 20 comprising a micro computer and from a host unit.

A paper selecting switch 11 provided on an operation panel of the printer is used to select between cut sheet paper and fan fold paper.

Fig. 2 shows one embodiment of the control device 20. In this embodiment the control device comprises a paper kind detector 21, a paper feeding amount detector 22, a memory 23, a coincidence detector 24, a reference position detector 25, a reciprocation amount setting means 26 and a reciprocation instruction means 27.

The paper kind detector 21 detects which kind of paper has been selected by means of the paper selecting switch 11. The paper feeding amount detector 22 detects the paper feeding amount by counting the driving pulses supplied to pulse motor 9 from the time when the paper tip reaches a reference position, for example when the paper tip reaches the paper sensor 7. Depending on the direction of rotation of the pulse motor 9, the count value in the paper feeding amount detector 22 is increased or decreased.

The memory 23 stores the contents of the paper feeding amount detector 22 at the time when during fan fold paper printing an interrupt printing is ordered and a corresponding signal output from the paper kind detector 21. The coincidence detec-

tor 24 compares the data stored in memory 23 with the contents of the paper feeding detector 22 and outputs a signal for stopping the pulse motor 9 when fan fold paper printing has to be restarted after the signal from the paper kind detector 21 indicated the end of an interrupt printing. The reference position detector 25 outputs a signal each time the fan fold paper passes the reference position. Using this signal, the fan fold paper is fed so that the paper tip projects a predetermined amount, for example 30 to 40 mm, from the paper pressing member 5, and the paper reciprocation between a paper bail 8 and the paper pressing member 5 can be performed. A stroke amount l' within the above mentioned predetermined amount has been previously set in the reciprocation amount setting means 26. The pulse motor 9 is driven according to the preset stroke amount l' by the reciprocation instruction means 27 to reciprocate several times, as will be explained in detail later.

The operation of the above explained embodiment of the invention will next be explained in detail with reference to the flow chart of Fig. 3. When the process is started, it is decided in step (a) whether fan fold paper is selected by the paper selecting switch 11. If the answer is YES, pulse motor 9 is controlled to drive platen 1 and tractor 2 in such a manner that the circumferential speed of the platen 1 is slightly higher than that of the tractor 2. The fan fold paper is thus advanced and guided by the paper guide 4 from a refuge area (step (b)). During this feeding of the fan fold paper it is detected whether the tip of the paper passes the paper sensor 7 and a signal is output from the reference position detector 25 in step (c). Upon the signal from the reference position detector 25, the fan fold paper is further advanced by the reciprocation instruction means 27 until it projects for a predetermined amount l from the paper pressing member 5 (step (d)). This condition is shown in Fig. 4(I). After that the reciprocation instruction circuit 27 outputs a driving signal corresponding to the stroke amount l' preset in the reciprocation amount setting means 26. In response to this driving signal, the motor driving circuit 10 drives the pulse motor 9 in the reverse direction to cause a backward feeding of the fan fold paper by tractor 2 (step (e)) (Fig. 4 (II)). Before the tip of the paper passes the paper pressing member 5 in the backward direction (opposite to arrow A in Fig. 1), the direction of rotation of pulse motor 9 is switched to forward rotation again (step (f)). Then the fan fold paper is again advanced towards the printing head 6 (step (g)) until it is detected in step (h) that the paper has been fed by the stroke amount l' .

After this reciprocation of the fan fold paper has been repeated a predetermined number of times (step (i)), the paper is fed to the initial posi-

tion (shown in Fig. 4 I) and maintained (step (j)). By the above mentioned reciprocation of the fan fold paper P tension is applied in the paper feeding direction by the sliding contact and, thus, any sagging of the paper is removed.

When this initial setting is completed, a printing signal is input. Then, the printing head 6 is operated and transversely moved relative to the paper (step (k)). At the end of a printing line pulse motor 9 is activated to have the paper advanced to the next printing line by tractor 2. The amount of this paper feeding is detected and kept by the paper feeding amount detector 22 (step (l)).

During the printing operation, if printing of a cut sheet is required, cut sheet paper is selected by means of the paper selecting switch 11. The paper kind detector 21 detects the interrupt printing at step (m) and stops printing by stopping the pulse motor 9. At the same time the current content of the paper feeding amount detector 22 is stored in the memory 23 (step (o)). Pulse motor 9 is rotated in the reverse direction to cause the tractor 2 to retract the fan fold paper P back to the tractor side (step (o)). The amount of backward movement of the paper is subtracted from the feeding amount held by the paper feeding amount detector 22 when the printing was stopped, until the front edge of the paper passes the reference position. When the fan fold paper is retracted to a predetermined position (step (p)), clearing the way for the cut sheet printing, the reverse rotation of pulse motor 9 is stopped (step (q)). In this condition, the cut sheet is set to perform the interrupt printing. To end the interrupt printing, fan fold paper is again selected by the paper selecting switch 11, causing paper kind detector 21 to output a corresponding signal. When this is detected in step (r), the tractor 2 is driven to feed the fan fold paper P towards the platen 1. When during this process the tip of the fan fold paper passes the paper sensor 7, a signal is output to the reciprocation instruction means 27. Then the paper feeding is continued and reciprocation of the paper carried out in the same way as described above according to steps (b) to (i) in Fig. 3. After the paper has been reciprocated the predetermined number of times, the reciprocation instruction means 27 controls pulse motor 9 to feed the fan fold paper towards the printing head 6. During this feeding, the amount of paper feeding is detected by the paper feeding amount detector 22 until the detected paper feeding amount coincides with the data stored in memory 23 (steps (j) and (s)). At this moment, the paper has reattained the position where the interrupt printing started. The coincidence detector 24 outputs the coincidence signal to motor driving circuit 10 to stop the paper feeding. Thereby, the fan fold paper is set to exactly the same condition it had before refuging. At

this time, the text to be printed is called to restart the printing, thereby continuing the printing from the position where it was stopped.

In the above described embodiment, platen 1 and tractor 2 are driven by a common pulse motor 9. The invention may, however, also be realized with the platen and the tractor being driven by independent motors.

Explanation to Fig. 3

- (a) fan fold paper selected? 5
- (b) feed paper 10
- (c) reference position of fan fold paper detected? 15
- (d) feed paper by 1 and update the paper feeding amount detector 22
- (e) retract paper and update the paper feeding amount detector 22
- (f) paper retracted by 1'?
- (g) feed paper and update the paper feeding amount detector 22 20
- (h) paper fed by 1'?
- (i) reciprocation performed a preset number of times? 25
- (j) count value of feeding amount detector 22 equal to value stored in memory 23?
- (k) print one line
- (l) advance paper by one line and update the paper feeding amount detector 22 30
- (m) interrupt instruction?
- (n) store current value of feeding amount detector 22 in memory 23
- (o) retract fan fold paper and update feeding amount detector 22 35
- (p) fan fold paper back in refuge position?
- (q) stop motor
- (r) interrupt printing completed?
- (s) advance paper until the value of the feeding amount detector 22 equals that of memory 23 40
- (t) everything printed? 45

Claims

1. A method for controlling the feeding of fan fold paper in a printer comprising a platen (1) and a pushtractor (2) for the feeding fan fold paper, said printer being adapted to selectively feed fan fold paper or cut sheet paper, wherein said method comprising the steps of:
 - (1) selecting a fan fold paper mode,
 - (2) feeding the fan fold paper (P) in a forward direction about the platen and detecting the amount of paper fed in the forward direction,
 - (3) detecting whether an interrupt signal oc-

curred indicating that a cut sheet mode has been selected,

(4) feeding, in response to an interrupt signal, the fan fold paper in a reverse direction equal to said detected amount by which the fan fold paper was fed in the forward direction, and

(5) feeding the fan fold paper upon the completion of the feeding of the cut sheet paper, in the forward direction by said detected amount,

characterized in that step (5) comprises the substeps of

(a) forward feeding the fan fold paper into a first position past a paper pressing member (5) resiliently contacting said platen (1),

(b) backward feeding the fan fold paper by a predetermined distance into a second position where the front edge of the fan fold paper lies between said first position and said paper pressing member (5) near to the latter

(c) forward feeding the fan fold paper by said predetermined distance, and

(d) forward feeding the fan fold paper into a position corresponding to said detected amount.

2. The method of claim 1, wherein substeps (b) and (c) are repeated a preset number of times before substep (d) is performed.

3. A paper feeding device in a printer adapted to selectively feed fan fold paper or cut sheet paper, comprising
a platen (1),
a pushtractor (2) for feeding fan fold paper, said pushtractor being located on the upstream side of said platen (1) with respect to the forward feeding direction (A) of the fan fold paper, and

control means (20) adapted to drive the push tractor in a reverse direction to remove the fan fold paper from the paper feeding path upon the feeding of cut sheet paper and to feed, upon completion of cut sheet paper feeding, the fan fold paper again in the forward direction for a length equal to the amount that the fan fold paper was fed in the reverse direction to return the fan fold paper to its previous printing position,

characterized by

a paper pressing member (5) resiliently contacting said platen (1), wherein

said control means acts to feed, upon completion of cut sheet paper feeding, the fan fold paper past the paper pressing member (5) into a first position, to reciprocate the fan fold

this time, the text to be printed is called to restart the printing, thereby continuing the printing from the position where it was stopped.

In the above described embodiment, platen 1 and tractor 2 are driven by a common pulse motor 9. The invention may, however, also be realized with the platen and the tractor being driven by independent motors.

Explanation to Fig. 3

- (a) fan fold paper selected? 5
- (b) feed paper
- (c) reference position of fan fold paper detected? 15
- (d) feed paper by 1 and update the paper feeding amount detector 22
- (e) retract paper and update the paper feeding amount detector 22
- (f) paper retracted by 1? 20
- (g) feed paper and update the paper feeding amount detector 22
- (h) paper fed by 1?
- (i) reciprocation performed a preset number of times? 25
- (j) count value of feeding amount detector 22 equal to value stored in memory 23?
- (k) print one line
- (l) advance paper by one line and update the paper feeding amount detector 22 30
- (m) interrupt instruction?
- (n) store current value of feeding amount detector 22 in memory 23
- (o) retract fan fold paper and update feeding amount detector 22 35
- (p) fan fold paper back in refuge position?
- (q) stop motor
- (r) interrupt printing completed?
- (s) advance paper until the value of the feeding amount detector 22 equals that of memory 23 40
- (t) everything printed? 45

Claims

1. A method for controlling the feeding of fan fold paper in a printer comprising a platen (1) and a pushtractor (2) for the feeding fan fold paper, said printer being adapted to selectively feed fan fold paper or cut sheet paper, wherein said method comprising the steps of:
 - (1) selecting a fan fold paper mode,
 - (2) feeding the fan fold paper (P) in a forward direction about the platen and detecting the amount of paper fed in the forward direction,
 - (3) detecting whether an interrupt signal oc-

curred indicating that a cut sheet mode has been selected,

(4) feeding, in response to an interrupt signal, the fan fold paper in a reverse direction equal to said detected amount by which the fan fold paper was fed in the forward direction, and

(5) feeding the fan fold paper upon the completion of the feeding of the cut sheet paper, in the forward direction by said detected amount,

characterized in that step (5) comprises the substeps of

(a) forward feeding the fan fold paper into a first position past a paper pressing member (5) resiliently contacting said platen (1),

(b) backward feeding the fan fold paper by a predetermined distance into a second position where the front edge of the fan fold paper lies between said first position and said paper pressing member (5) near to the latter

(c) forward feeding the fan fold paper by said predetermined distance, and

(d) forward feeding the fan fold paper into a position corresponding to said detected amount.

2. The method of claim 1, wherein substeps (b) and (c) are repeated a preset number of times before substep (d) is performed.

3. A paper feeding device in a printer adapted to selectively feed fan fold paper or cut sheet paper, comprising

a platen (1),

a pushtractor (2) for feeding fan fold paper, said pushtractor being located on the upstream side of said platen (1) with respect to the forward feeding direction (A) of the fan fold paper, and

control means (20) adapted to drive the push tractor in a reverse direction to remove the fan fold paper from the paper feeding path upon the feeding of cut sheet paper and to feed, upon completion of cut sheet paper feeding, the fan fold paper again in the forward direction for a length equal to the amount that the fan fold paper was fed in the reverse direction to return the fan fold paper to its previous printing position,

characterized by

a paper pressing member (5) resiliently contacting said platen (1), wherein

said control means acts to feed, upon completion of cut sheet paper feeding, the fan fold paper past the paper pressing member (5) into a first position, to reciprocate the fan fold



paper between this first position and a second position where the front edge of the fan fold paper (P) lies between said first position and said paper pressing member (5) near to the latter, at least once, and then to return the fan fold paper to its previous printing position.

4. The device according to claim 3, wherein said control means (20) comprises:

a reference position detector (25) for outputting a detection signal each time the fan fold paper passes a reference position,

a reciprocation instruction means (27) for controlling the reciprocation of the fan fold paper,

a feeding amount detector (22) for up- and down-counting the feeding amount of the fan fold paper depending on the feeding direction,

a memory (23) for storing the content of said feeding amount detector (22) and

a coincidence detector (24) for comparing the contents of the feeding amount detector (22) with that of the memory (23),

wherein said reciprocation instruction means (27) causes said reciprocation of the fan fold paper upon a detection signal from the reference position detector (25), and said coincidence detector (24) controls the paper feeding into a print start position until coincidence between the content of the feeding amount detector (22) and that of the memory (23) is detected, and

wherein upon an interruption instruction signal the current contents of the feeding amount detector (22) is stored in the memory (23) prior to removing the fan fold paper from the paper feeding path for interrupt printing of cut sheet paper.

5. The device of claim 3 further comprising:

switch means (11) for outputting an indication signal indicating that one of a cut sheet mode corresponding to feeding of cut sheet paper and a fan fold mode corresponding to feeding of fan fold paper has been selected,

a paper detector (7) for detecting the presence of the leading edge of the fan fold paper at a predetermined position and

a driving circuit (10) for driving the push tractor (2) in response to an output from the control means (20),

the control means including:

switch detector means (21) for detecting the indication signal and providing an interrupt signal when the indication signal indicates a cut sheet mode,

paper feed detector means (22) for detecting the amount of fan fold paper fed by the

push tractor prior to the producing of the interrupt detection signal and outputting the amount detected,

memory means (23) for recording the amount detected by the paper feed in response to the interrupt signal,

coincidence detector means (24) for producing a stop motor signal when the paper feed amount is equal to the amount stored in the memory means, the driving circuit causing the push tractor to stop feeding in response to the stop motor signal,

a reference position detector (25) for outputting a reference position detect signal when the paper detector means (7) has detected the leading edge of the fan fold paper,

reciprocation setting means (26) for storing a predetermined reciprocation distance and producing a distance output signal, and

reciprocation instruction means (27) for receiving the reference position detect signal and the distance output signal and outputting a reciprocation instruction signal to cause the push tractor to feed said fan fold paper in a forward and backward manner in response thereto.

Patentansprüche

1. Verfahren zur Steuerung des Transports von Endlospapier in einem Drucker, der eine Schreibwalze (1) und einen Schubtraktor (2) für die Endlospapierzufuhr aufweist und wahlweise Endlospapier oder Einzelblattpapier zuführen kann, wobei das Verfahren die Schritte umfaßt:

- (1) Wählen einer Endlospapierbetriebsart,
- (2) Transport des Endlospapiers (P) in Vorwärtsrichtung um die Schreibwalze und Feststellen des Betrages, um den das Papier in Vorwärtsrichtung transportiert wurde,
- (3) Feststellen, ob ein Interruptsignal aufgetreten ist, das anzeigt, daß eine Einzelblattbetriebsart gewählt wurde,

- (4) Transportieren des Endlospapiers als Antwort auf ein Interruptsignal in Rückwärtsrichtung um einen Betrag gleich dem festgestellten Betrag, um den das Endlospapier in der Vorwärtsrichtung transportiert wurde, und

- (5) Transportieren des Endlospapiers nach Abschluß der Zufuhr des Einzelblattpapiers in Vorwärtsrichtung um den festgestellten Betrag,

dadurch gekennzeichnet, daß Schritt (5) folgende Unterschritte aufweist:

- (a) Vorwärtstransportieren des Endlospapiers in eine erste Position, an einem Papierandruckelement (5) vorbei, das elastisch



an der Schreibwalze (1) anliegt,

(b) Rückwärtstransportieren des Endlospapiers um ein vorbestimmtes Stück in eine zweite Position, in der die Vorderkante des Endlospapiers zwischen der ersten Position und dem Papierandruckelement (5), nahe zu letzterem, liegt,

(c) Vorwärtstransportieren des Endlospapiers um das vorbestimmte Stück und

(d) Vorwärtstransportieren des Endlospapiers in eine Position entsprechend dem festgestellten Betrag.

2. Verfahren nach Anspruch 1, bei dem die Unterschritte (b) und (c) eine voreingestellte Anzahl von Malen wiederholt werden, bevor der Unterschritt (d) ausgeführt wird.

Papierzuführvorrichtung in einem Drucker, der wahlweise Endlospapier oder Einzelblattpapier zuführen kann, umfassend

eine Schreibwalze (1),

einen Schubtraktor (2) zum Transport von Endlospapier, der bezogen auf die Vorwärtstransportrichtung (A) des Endlospapiers hinter der Schreibwalze (1) angeordnet ist, und

eine Steuereinrichtung (20), die in der Lage ist, den Schubtraktor in Rückwärtsrichtung anzutreiben, um das Endlospapier zur Zuführung von Einzelblattpapier aus der Papierzuführbahn zu entfernen und nach Beendigung der Einzelblattpapierzufuhr das Endlospapier wieder in Vorwärtsrichtung um eine Länge zu transportieren, die gleich dem Betrag ist, um die das Endlospapier in Rückwärtsrichtung transportiert wurde, um es in seine vorherige Druckposition zurückzubringen,

gekennzeichnet durch

ein Papierandruckelement (5), das elastisch an der Schreibwalze (1) anliegt, wobei

die Steuereinrichtung bewirkt, daß nach Abschluß der Einzelblattpapierzufuhr das Endlospapier an dem Papierandruckelement (5) vorbei in eine erste Position transportiert wird, das Endlospapier zwischen dieser ersten Position und einer zweiten Position, in der die Vorderkante des Endlospapiers (P) zwischen der ersten Position und dem Papierandruckelement (5), nahe zu letzterem liegt, wenigstens einmal hin- und herzubewegt wird und das Endlospapier dann in seine vorherige Druckposition zurückgebracht wird.

4. Vorrichtung nach Anspruch 3, bei der die Steuereinrichtung (20) umfaßt:

einen Bezugspositionsdetektor (25) zur Ausgabe eines Detektorsignals jedesmal, wenn das Endlospapier eine Bezugsposition passiert,

eine Hin- und Her-Bewegungs-Befehlseinrichtung (27) zur Steuerung der Hin- und Herbewegung des Endlospapiers,

einen Transportbetragsdetektor (22) zum Aufwärts- und Abwärtszählen des Transportbetrags des Endlospapiers abhängig von der Transportrichtung,

einen Speicher (23) zur Speicherung des Inhalts des Transportbetragsdetektors (22) und

einen Koinzidenzdetektor (24) zum Vergleich des Inhalts des Transportbetragsdetektors (22) mit dem des Speichers (23),

wobei die Hin- und Her-Bewegungs-Befehlseinrichtung (27) die Hin- und Herbewegung des Endlospapiers aufgrund eines Detektorsignals von dem Bezugspositionsdetektor (25) bewirkt und der Koinzidenzdetektor (24) den Papiertransport in eine Druck-Startposition steuert, bis Koinzidenz zwischen dem Inhalt des Transportbetragsdetektors (22) und dem des Speichers (23) festgestellt wird, und

wobei aufgrund eines Interrupt-Befehlssignals der momentane Inhalt des Transportbetragsdetektors (22) in dem Speicher (23) gespeichert wird, bevor das Endlospapier für den Unterbrechungsdruck auf Einzelblattpapier aus der Papierzuführbahn entfernt wird.

5. Vorrichtung nach Anspruch 3, ferner umfassend:

eine Schalteinrichtung (11) zur Ausgabe eines Kennzeichnungssignals, das angibt, daß eine Einzelblattbetriebsart entsprechend der Zufuhr von Einzelblattpapier oder eine Endlosbetriebsart entsprechend der Zufuhr von Endlospapier ausgewählt wurde,

einen Papierdetektor (7) zur Feststellung des Vorhandenseins der Vorderkante von Endlospapier an einer vorbestimmten Position und

eine Treiberschaltung (10) zum Antrieb des Schubtraktors (2) als Antwort auf ein Ausgangssignal der Steuereinrichtung (20),

wobei die Steuereinrichtung enthält:

eine Schalter-Detektor Einrichtung (21) zur Erfassung des Kennzeichnungssignals und zur Lieferung eines Interruptsignals, wenn das Kennzeichnungssignal eine Einzelblattbetriebsart angibt

eine Papiertransportdetektoreinrichtung (22) zur Feststellung des Betrags von Endlospapier, der von dem Schubtraktor transportiert wurde, bevor das Interrupt-Detektorsignal erzeugt wurde, und zur Ausgabe des festgestellten Betrags,

eine Speicheranordnung (23) zur Speicherung des festgestellten Betrags des Papiertransports als Antwort auf das Interruptsignal,

eine Koinzidenzdetektoranordnung (24) zur



Erzeugung eines Motorstoppsignals, wenn der Papiertransportbetrag gleich dem in der Speicheranordnung gespeicherten Betrag ist, wobei die Treiberschaltung verursacht, daß der Schubtraktor den Transport als Antwort auf das Motorstoppsignal stoppt,

einen Bezugspositionsdetektor (25) zur Ausgabe eines Bezugspositionsdetektorsignals, wenn die Papierdetektoreinrichtung (7) die Vorderkante des Endlospapiers erfaßt hat,

eine Hin- und Her-Bewegungs-Einstelleinrichtung (26) zur Speicherung einer vorbestimmten Hin- und Herbewegungs-Entfernung und zur Erzeugung eines Entfernungsausgangssignals und

eine Hin- und Her-Bewegungsbefehlseinrichtung (27) zum Empfang des Bezugspositionsdetektorsignals und des Entfernungsausgangssignals und zur Ausgabe eines Hin- und Her-Bewegungsbefehlssignals, um zu veranlassen, daß der Schubtraktor als Antwort darauf das Endlospapier vorwärts und rückwärts transportiert.

Revendications

1. Un procédé de commande de l'avance du papier en continu à pliage paravent dans une imprimante comprenant un rouleau (1) et un entraîneur à picots (2) travaillant en poussée pour faire avancer du papier en continu à pliage paravent, cette imprimante étant conçue pour faire avancer sélectivement du papier en continu à pliage paravent ou du papier en feuilles séparées,

ce procédé comprenant les étapes suivantes :

- (1) on sélectionne un mode de papier en continu à pliage paravent,
- (2) On fait avancer le papier en continu à pliage paravent (P) dans un sens avant autour du rouleau, et on détecte la distance d'avance du papier dans le sens avant,
- (3) on détecte l'apparition éventuelle d'un signal d'interruption indiquant qu'un mode de feuilles séparées a été sélectionné,
- (4) sous l'effet d'un signal d'interruption, on déplace le papier en continu à pliage paravent en sens arrière sur une distance égale à la distance détectée sur laquelle le papier en continu à pliage paravent a été avancé en sens avant, et
- (5) lorsque l'avance du papier en feuilles séparées est terminée, on fait avancer le papier en continu à pliage paravent en sens avant, sur la distance détectée,

caractérisé en ce que l'étape (5) comprend les sous-étapes suivantes :

(a) on fait avancer le papier en continu à pliage paravent en sens avant jusqu'à une première position au-delà d'une pièce de pression de papier (5) qui vient en contact élastique avec le rouleau (1),

(b) on rétracte le papier en continu à pliage paravent sur une distance prédéterminée, jusqu'à une seconde position à laquelle le bord avant du papier en continu à pliage paravent se trouve entre la première position et la pièce de pression de papier (5), près de cette dernière,

(c) on fait avancer le papier en continu à pliage paravent en sens avant, sur la distance prédéterminée, et

(d) on fait avancer le papier en continu à pliage paravent en sens avant jusqu'à une position prédéterminée correspondant à la distance détectée.

2. Le procédé de la revendication 1, dans lequel on répète les sous-étapes (b) et (c) un nombre de fois prédéterminé, avant d'accomplir la sous-étape (d).

3. Un dispositif d'avance de papier dans une imprimante conçue pour faire avancer sélectivement du papier en continu à pliage paravent ou du papier en feuilles séparées, comprenant :

un rouleau (1),

un entraîneur à picots (2) fonctionnant en poussée, destiné à faire avancer le papier en continu à pliage paravent, cet entraîneur à picots étant placé du côté amont du rouleau (1) lorsqu'on considère la direction de déplacement en sens avant (A) du papier en continu à pliage paravent, et

des moyens de commande (20) conçus pour faire fonctionner l'entraîneur en picots en sens arrière de façon à retirer le papier en continu à pliage paravent du chemin d'avance du papier, au moment de l'avance du papier en feuilles séparées, et pour déplacer à nouveau en sens avant le papier en continu à pliage paravent, à l'achèvement de l'avance du papier en feuilles séparées, sur une longueur égale à la distance sur laquelle le papier en continu à pliage paravent a été déplacé en sens arrière, pour ramener le papier en continu à pliage paravent à sa position d'impression précédente,

caractérisé par

une pièce de pression de papier (5) venant en contact élastique avec le rouleau (1), et dans lequel

à l'achèvement de l'avance du papier en feuilles coupées, les moyens de commande



font avancer le papier en continu à pliage paravent au-delà de la pièce de pression de papier (5), jusqu'à une première position, pour déplacer d'un mouvement alternatif le papier en continu à pliage paravent entre cette première position et une seconde position dans laquelle le bord avant du papier en continu à pliage paravent (5) se trouve entre la première position et la pièce de pression du papier (5), près de cette dernière, au moins une fois, après quoi ils ramènent le papier en continu à pliage paravent à sa position d'impression précédente.

4. Le dispositif selon la revendication 3, dans lequel les moyens de commande (20) comprennent :

un détecteur de position de référence (25) qui est destiné à émettre un signal de détection chaque fois que le papier en continu à pliage paravent passe par une position de référence,

des moyens de génération d'instruction de mouvement alternatif (27) destinés à commander le mouvement alternatif du papier en continu à pliage paravent,

un détecteur de distance d'avance (22) destiné à compter en sens croissant et en sens décroissant la distance d'avance du papier en continu à pliage paravent, en fonction du sens d'avance,

une mémoire (23) destinée à enregistrer le contenu du compteur de distance d'avance (22), et

un détecteur de coïncidence (24) destiné à comparer le contenu du détecteur de distance d'avance (22) avec celui de la mémoire (23),

dans lequel les moyens de génération d'instruction de mouvement alternatif (27) provoquent le mouvement alternatif du papier en continu à pliage paravent sous l'effet d'un signal de détection provenant du détecteur de position de référence (25), et le détecteur de coïncidence commande l'avance du papier pour l'amener à une position de départ d'impression, jusqu'à la détection de la coïncidence entre le contenu du détecteur de distance d'avance (22) et celui de la mémoire (23), et

dans lequel sous l'effet d'un signal d'instruction d'interruption, le contenu courant du détecteur de distance d'avance (22) est enregistré dans la mémoire (23), avant que le papier en continu à pliage paravent ne soit retiré du chemin d'avance du papier, pour l'impression d'interruption avec le papier en feuilles séparées.

5. Le dispositif de la revendication 3, comprenant

en outre :

des moyens de commutation (11) destinés à émettre un signal d'indication qui indique la sélection d'un mode parmi un mode de feuilles séparées correspondant à l'avance de papier en feuilles séparées, et un mode de pliage paravent correspondant à l'avance de papier en continu à pliage paravent,

un détecteur de papier (7) qui est destiné à détecter la présence du bord avant du papier en continu à pliage paravent à une position prédéterminée, et

un circuit d'attaque (10) destiné à entraîner l'entraîneur à picots (2), fonctionnant en poussée, sous l'effet d'un signal de sortie des moyens de commande (20),

les moyens de commande comprenant :

des moyens de détection de position de commutateur (21) qui sont destinés à détecter le signal d'indication et à produire un signal d'interruption lorsque le signal d'indication indique un mode de feuilles séparées,

des moyens de détection d'avance de papier (22) destinés à détecter la distance d'avance du papier en continu à pliage paravent sous l'action de l'entraîneur à picots fonctionnant en poussée, avant la génération du signal de détection d'interruption et l'émission de la distance détectée,

des moyens de mémoire (23) destinés à enregistrer la distance détectée correspondant à l'avance du papier, sous l'effet du signal d'interruption,

des moyens de détection de coïncidence (24) destinés à produire un signal d'arrêt du moteur lorsque la distance d'avance du papier est égale à la distance enregistrée dans les moyens de mémoire, le circuit d'attaque faisant en sorte que l'entraîneur à picots cesse de faire avancer le papier, sous l'effet du signal d'arrêt du moteur,

un détecteur de position de référence (25) destiné à émettre un signal de détection de position de référence lorsque le détecteur de papier (7) a détecté le bord avant du papier en continu à pliage paravent,

des moyens de détermination de mouvement alternatif (26) destinés à enregistrer une distance de mouvement alternatif prédéterminée et à produire un signal de sortie de distance, et

des moyens de génération d'instruction de mouvement alternatif (27) qui sont destinés à recevoir le signal de détection de position de référence et le signal de sortie de distance, et à émettre un signal d'instruction de mouvement alternatif sous l'effet duquel l'entraîneur à picots fonctionnant en poussée déplace en



sens avant et en sens arrière le papier en
continu à pliage paravent.

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* C L M S *