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PRINTER PLATEN CONTROL SYSTEM

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Sheet 2 of 2

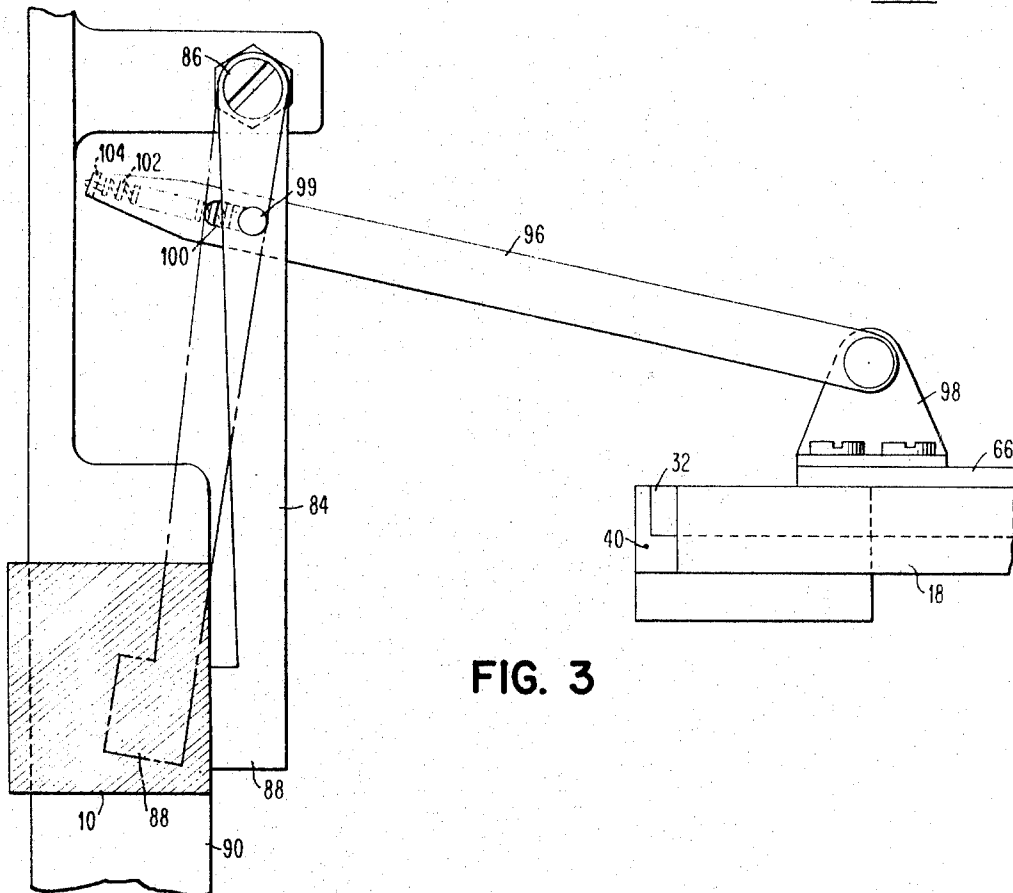


FIG. 3

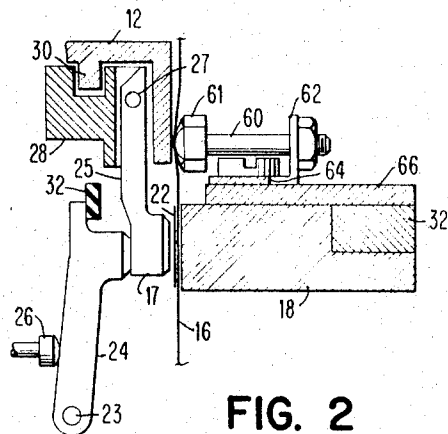


FIG. 2

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3,451,335

PRINTER PLATEN CONTROL SYSTEM

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10 Claims

ABSTRACT OF THE DISCLOSURE

An adjustable printer platen is activated when a type carrier gate is closed, to provide a predetermined relation with the type carrier, and when the carrier gate is opened an interlock prevents reclosing the carrier gate until the platen is returned to a retracted position.

Field of invention

The invention relates to automatic control of adjustable printer platens.

Description of the prior art

Adjustable printer platens are known in which an operator manually adjusts a movable platen relative to a type carrier by setting a lever or knob which actuates the platen to a position selected on a basis of a table which designates different knob or lever positions for different numbers of forms to be printed on at one time.

Summary of the invention

Generally stated, it is an object of this invention to provide an improved platen control system for printers.

More specifically it is an object of this invention to provide in an on-the-fly front printer for automatically adjusting the position of a platen when a type carrier gate is closed on an inserted form or forms.

The present invention provides for sensing the thickness of a form or forms in a printer and automatically moving a platen into a preselected position relative to the form or forms when a type carrier gate is closed.

Another object of this invention is the provision of a sensing device on a movable platen for controlling the operation of a platen positioning motor.

Yet another object of the invention is to provide for more accurate positioning of a print platen in an on-the-fly front printer.

It is also an important object of this invention to prevent closing a type carrier gate in a printer unless a print platen is sufficiently retracted so as to prevent damage to the machine.

Another important object of the invention is to insure adequate spacing for a plurality of print forms in a printer by requiring retraction of an adjustable print platen before a type carrier gate can be closed.

Still another object of the invention is to provide an interlock which interferes with reclosing a type carrier gate in a printer until the interlock has been withdrawn by retracting the platen, so as to provide adequate spacing for any inserted forms.

It is also an important object of this invention to provide in an automatic platen control system for operating a switch when opening a type carrier gate so as to effect operation of a motor to retract the print platen, operating the same switch when the gate is closed to complete a circuit for operating the motor to advance the platen to a predetermined position relative to the type carrier, and for operating another switch when the platen is closed and a sense member movable when the platen engages a form or forms between the type carrier and

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the platen to stop the motor with the platen in the desired position.

In a preferred form of the invention, a back-up print platen for a front on-the-fly train printer is provided with a longitudinally sliding wedge bar which moves the platen towards and away from the type elements of a train type cartridge mounted on a swinging type carrier gate. A geared motor drives a cam which slides the wedge bar back and forth, thus moving the platen towards and away from the type carrier. An adjustable sense pin carried by a lever supported on the wedge bar for pivotal movement relative to the platen, controls a switch which operates the motor to move the platen toward the type when the gate is closed until the sense pin engages the document. An interlock mounted on the frame moves between the frame and the type carrier gate to prevent reclosing the gate when the platen is not in a retracted position, such as is the case when the gate is opened during a power failure and is reclosed on a thicker form while the power is still off. The interlock is moved out of the way in normal operation by operation of the motor to retract the platen when the gate is open and power is available.

The foregoing and other objects, features and advantages of the invention will be apparent from the following more particular description of a preferred embodiment of the invention as illustrated in the accompanying drawings.

Description of the drawings

In the drawings:

FIG. 1 is a partial plan view of a portion of a printer mechanism embodying the invention in one of its forms;

FIG. 2 is an enlarged partial sectional view taken along the line 2-2 of FIG. 1;

FIG. 3 is an enlarged partial vertical section taken along the line 3-3 of FIG. 1; and

FIG. 4 is a schematic circuit diagram of the control circuit for the motor of FIG. 1.

Description of a preferred embodiment

Referring to FIG. 1, a reference numeral 10 denotes generally the mechanical elements of a print mechanism for a high speed printer in which a type cartridge 12 is mounted on a swinging gate structure 14 pivotally mounted by means of a pivot 15 for permitting the insertion and removal of a form or forms 16 upon which a printing operation is to be performed. The printer may be generally of the type disclosed in Patent No. 3,224,366 which issued on Dec. 21, 1965 to J. M. Cunningham and is assigned to the assignee of the present invention. Whereas, the printer shown in the subject patent is of the back printer type, the printer of the present application is a front printer, and as shown in FIGS. 1 and 2 the document or form 16 on which a printing operation is to be performed is positioned between type elements represented by the element 17 shown in FIG. 2 as mounted in the cartridge 12 for movement along a print line, and a platen 18 which provides a back-up for the document 16 when a type element 17 is impacted against the document and a ribbon 22 by means of one or more hammers 24 pivotally mounted on pivots 23 and actuated by means such as the push rod 26 which corresponds to the operating mechanism in the Cunningham patent hereinbefore referred to.

Instead of having fixed character bearing elements as in the subject patent, the type elements 17 of the present application are formed on levers 25 which are pivotally supported by means such as a pin 27 in type carrying members 28 which are disposed in a train arrangement as described in the Cunningham patent on a

rail 30 which guides the type members past a print line. A resilient impression control member 32 engages a portion of a hammer 24 to limit the operating velocity thereof.

In order to provide the proper relative positioning of the type elements 17 and the form 16, the platen 18 is made adjustable. The platen 18 is, for example, provided with a longitudinally slideable wedge bar 32 having inclined cam surface portions 34 and 36 which bear against corresponding inclined surface portions of wedge blocks 38 and 40 secured to a portion of the frame 42. The wedge bar 32 is provided with a guide slot 44 which receives a pin 46 secured to a portion of the platen 18 for limiting movement of the guide bar to a longitudinal direction relative to the platen 18. A transverse slot 48 cooperates with a pin 50 mounted in the frame to limit movement of the platen 18 relative to the frame towards and away from the type cartridge 12 in response to longitudinal movement of the wedge bar 32. Movement of the wedge bar 32 is effected by means of a geared motor 52 which operates an eccentric cam 54 positioned in a slot 56 in the wedge bar 32 for moving the wedge bar back and forth longitudinally in response to rotation of the cam 54. A spring 58 connected between the frame 42 and the platen 18 serves to bias the platen and hold the guide bar 32 against the wedge blocks 38 and 40.

In order to locate the platen 18 in the proper position depending on the thickness of the form or forms 16, positioned between the platen and the type cartridge 12, sensing means is provided comprising an adjustable pin 60 having a head portion 61 for engaging the form 16 and pressing it against a stationary surface such as that of the cartridge 12 to measure the thickness of the form. The pin 60 is adjustably secured in an upstanding log 62 of a pivoted latch lever 64 mounted by means of pivot screw 65 on a plate 66 secured to the wedge bar 32. A switch lever 68 for operating a switch 70 is pivotally mounted on the plate 66 by means of a pivot screw 72. A spring 74 connects the levers 64 and 68 urging them both in a clockwise direction. The lever 68 is provided with a tail portion 76 which engages a stationary stop pin 78 when the wedge bar 32 is moved to its most right hand position, for rotating the switch lever in a counterclockwise direction to operate the switch 70 and permit the latch lever 64 to latch the lever 68 in position with the switch 70 closed. A switch 80 is provided on the frame for engagement by a stop member 82 movable with the wedge bar 32.

Referring to FIGS. 1 and 3, it will be seen that an interlock lever 84 is pivotally mounted on a portion 90 of the frame by means of a pivot 86, and is provided with a projecting foot portion 88 which when moved between the frame portion 90 and the end portion of the gate 14 in the position shown in dot and dash outline prevents closing the gate to a position where it may be latched by means of its latch 92, which is pivotally mounted on the gate 14 for engaging a latch element 94 on the frame. The interlock 84 is actuated by a lever 96 which is pivotally connected to the wedge bar 32 by means of a bracket 98 to move therewith and is connected to the interlock 84 by means of a pin 99 slideable in a slot 100 in the lever 96. A spring 102 connected between the pin 99 and an upturned end portion 104 of the lever 96 provides a resilient operating connection between the two levers.

Referring to FIG. 4, it will be seen that the armature A of the motor 52 is connected to a source of electrical energy through contact of a switch 100 mounted on the frame and actuated by the gate 14 when in a closed position, and alternately through the switches 70 and 80 under different operating conditions.

With the gate 14 in the closed position as shown, the stop 82 is removed from the switch 80, and the switch 80 is in the closed position as shown in FIG. 4. The

switch 100 on the frame is activated by the swinging gate 14, and is in the closed position shown in FIG. 4 while the switch 70 will be in the open condition, since the switch lever 68 will have been released as shown in FIG. 1 by counterclockwise movement of the latch lever 64 when the sense pin 60 engaged the document. Accordingly, the circuit for the armature A is de-energized. When the latch 92 is released and the gate 14 is opened to change the form or forms 16, the moving member of switch 100 moves away from contact a and engages contact b. Since the limit switch 80 is closed, a circuit is provided for energizing the armature A of the motor 52 to operate the motor. The motor will run. As the cam 54 rotates, the wedge bar 32 will be moved longitudinally back and forth. As soon as the wedge bar 32 moves to the right and the stop 82 engages the operating member of the limit switch 80 for the most retracted position of the platen 18, the switch 80 will be opened, interrupting the operating circuit for the motor armature, thus leaving the platen in the most retracted position. As the platen reaches the retracted position, the switch lever 68 engages the stop 78, operating the lever 68 in a counterclockwise direction to close the switch 70. Spring 74 urges the latch lever 64 in a clockwise direction to latch up behind the shoulder on the lever 68, thus holding the switch 70 in the closed position and restoring the sense pin 70 to a starting position. The interlock lever 84 will be withdrawn from interfering relation between the swinging gate 14 and the frame 90 by means of connecting lever 96 which is attached to the wedge bar 32, in response to movement of the wedge bar to the right, or the retracted position.

When a form or forms are inserted in the printer, the operator will close the swinging gate 14 and operate the latch 92 to lock the gate 14 in the closed position. When the gate 14 closes, switch 100 is operated to engage contact member a, thus providing a circuit for the armature of the motor 52 through contact a of the switch 100 and the now closed switch 70, so as to operate the motor 52. The cam 54 in operating, moves the wedge bar 32 toward the left and the cam surfaces 32 and 34 advance the wedge bar towards the cartridge 12, moving the platen 18 therewith. Motion of the platen is limited to a backward and forward movement relative to the cartridge 12 by means of the slot 48 and the pin 50, whereas the wedge bar moves longitudinally from right to left and vice versa. When the sense pin 60 engages the form 16, the lever 64 is moved in a counterclockwise direction and moves from behind the shoulder portion of the lever 68, which is then urged by the spring 74 in a clockwise direction, opening the switch 70 and interrupting the operating circuit for the armature of the motor 52. This stops the platen in the proper operating position relative to the type cartridge 12.

Under a "power off" condition the type carrier gate 14 could be opened while the platen 18 is set for a minimum forms thickness. If thicker forms are then placed in the machine and the gate 14 reclosed, interference could occur between the forms and the type elements, jamming the type into the forms which are backed up by the extended platen, so that damage to the type elements could result. To avoid this possibility, the interlock lever 84 is provided. When the gate is closed and the platen 18 is adjusted for a printing operation, the wedge bar 32 will be moved toward the left and the lever 96 and spring 102 tend to rotate the interlock lever 84 in a clockwise direction urging it against the side of the adjacent portion of the gate 14. If the gate 14 is opened, the foot portion 88 of the interlock lever will move between the frame 90 and the gate 14, so that the gate cannot be reclosed until the motor 54 is restarted to move the wedge bar 32 to the extreme right position, which also restores the platen 18 to the retracted position, thus providing clearance for thick or multiple forms. The slot and spring connection between the lever 96 and the interlock lever 84 permits

the lever 84 to be stopped against the side of the gate 14 so that the spring 102 is tensioned for operating the lever 84 into interfering relation between the gate 14 and the frame 90 whenever the gate is opened, where it will remain if the power is off.

From the above description and the accompanying drawings it will be apparent that the provision has been made for automatically retracting the platen when the type carrier gate is opened, and adjusting the position of the platen in a front printer whenever the type carrier gate is closed to start a printing operation. Proper adjustment of the platen is maintained for a wide variation in the thickness of the forms, and optimum operating conditions are maintained at all times. In the event of a power failure, the interlock lever provides protection against inadvertent replacing of the form with a thicker one while the power is off, and reclosing the gate on the thicker form without power being available to retract the platen.

While the invention has been particularly shown and described with reference to a preferred embodiment thereof, it will be understood by those skilled in the art that various changes in form and detail may be made therein without departing from the spirit and scope of the invention.

What is claimed is:

1. The combination in a platen control system for a printer having a frame with a swinging type carrier gate mounted thereon with a pivot adjacent one end for pivotally supporting a plurality of type bearing members movable along a track opposite a print line on a document to permit swinging movement to bring the type bearing members into and out of operating position, and having movable character bearing elements with actuating means for actuating the elements transversely of the track to impact a document to be printed,

of a platen structure adjustably supported on the frame to provide a backing surface for the document on the opposite side from the type members,

means including a motor-operated cam member supported by the frame to engage the platen structure for moving the platen structure toward and away from the type members, and

means for effecting operation of the motor to move the platen structure into predetermined spaced relation with the document when the type carrier gate is swung into operating position including stop means having a sensing member mounted in movable relation with the platen for engaging a document positioned between the platen structure and the type carrier.

2. A platen control system as defined in claim 1 characterized by the platen structure comprising a platen with resilient biasing means and a wedge bar slidable longitudinally of the platen and having an inclined cam surface portion cooperating with a corresponding cam portion on the frame to move the platen transversely toward and away from the type elements.

3. A platen control system as defined in claim 2 characterized by the sensing member being carried by and

movable relative to the wedge bar for operating a switch connecting the motor to and disconnecting it from a source of electrical energy.

4. A platen control system as defined in claim 3 characterized by the platen being restricted to transverse movement by a pin and slot connection with the frame, and the wedge bar being secured to the platen by a pin and slot connection to provide only longitudinal relative movement therebetween.

5. A platen control system as defined in claim 4 characterized by interlock means operable when the type carrier gate is swung open from a closed operating position to prevent reclosing the carrier gate until the platen is operated to a retracted position.

6. A platen control system as defined in claim 5 characterized by the interlock means comprising a lever pivotally supported on the frame to move into interfering relation between the carrier gate and the frame, and having a lost motion operating connection with the wedge bar for actuating the lever into said interfering relation when the platen is not retracted.

7. A platen control system as defined in claim 6 characterized by switch means actuated by the carrier gate and the platen sensing member connected to provide an operating circuit for the motor to advance the platen when the carrier gate is closed; to interrupt energization of the motor when the sensing member engages the document, and to provide a circuit for operating the motor to retract the platen when the carrier gate is opened.

8. A platen control system as defined in claim 7 characterized by the sensing member being carried by a lever pivotally supported on the wedge bar for movement therewith and operable to releasably engage a switch actuating lever to effect operation of the sensing member switch when the sensing member engages the document.

9. A platen control system as defined in claim 8 characterized by the switch actuating lever being so resiliently connected to the sensing lever as to be actuated by a stationary stop in response to movement of the wedge bar to retract the platen to latch up the sensing member.

10. A platen control system as defined in claim 9 characterized by the motor operated cam being positioned in a groove in the wedge bar to effect reciprocating movement of the wedge bar back and forth for rotation of the motor in a single direction.

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WILLIAM B. PENN, *Primary Examiner.*

U.S. Cl. X.R.

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