FIG. 2
ABSTRACT OF THE DISCLOSURE

An adjustable printer platen is retracted by operation of a type carrier gate locking handle in opening the gate, and is advanced by operation of the handle to lock the gate in the closed position until a sensing mechanism engages the form and locks the mechanism against further advance of the platen.

FIELD OF INVENTION

The invention relates to automatic adjusting of printer platens, particularly in front printers where clearance are generally critical.

DESCRIPTION OF PRIOR ART

Adjustable printer platens are known in which an operator loosens a clamp and manually adjusts the platen by setting a lever or knob which actuates the platen to a position selected on the basis of a table which designates different knob or lever positions for different form thicknesses.

SUMMARY OF INVENTION

Generally stated, it is an object of this invention to provide a simple and effective platen control system for a printer.

More specifically, it is an object of this invention to provide in an on-the-fly printer for mechanically connecting a platen positioning mechanism with the operating handle for a swinging gate type carrier.

It is also an object of this invention to provide for automatically retracting an adjustable print platen whenever the type carrier gate of the printer is opened, and for advancing it into predetermined operating relation with the form to be printed upon, whenever the type carrier gate is closed.

Yet another object of the invention is to provide for close positioning of a printer platen in a front printer without incurring damage to the type carrier by reason of jamming the carrier against a relatively thick form when the carrier gate is closed.

Another important object of this invention is to provide a spring biased platen with a resilient cam operating mechanism for advancing the platen.

Yet another object of the invention is to provide releasable latch means for locking a platen camming mechanism against further advance whenever a sensing mechanism senses that the type carrier gate is in predetermined relation with a form in the printer.

It is still an important object of the invention to provide for resiliently biasing a printer platen to a retracted position, and biasing an operating mechanism to advance the platen whenever locking the type carrier gate.

Still another object of this invention is to provide for resiliently connecting a platen advancing mechanism to the type carrier gate control handle, and for determining the advance of the platen by releasing a latch member when the form is sensed to block further advance of the platen advancing mechanism.

In a preferred form of the invention, a back up print platen for a front on-the-fly train printer is mounted for movement toward and away from the type elements of a train type cartridge which is mounted on a swinging type carrier gate. A rotatable cam mechanism for adjusting the platen position is connected by a spring to the control handle of the latch mechanism which locks the gate closed, so as to advance the platen as the control handle is moved to the locking position. A releasable sensing member carried by the platen engages the form when the platen advances to the proper position relative to the form, and releases a pawl which prevents a further advance movement of the cam mechanism, thus locating the platen in predetermined relation with the form.

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:

FIGURE 1 is a schematic isometric view of a portion of a printer mechanism embodying the invention in one of its forms, and

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

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring generally to FIGURE 1 of the drawings, reference numeral 10 denotes the mechanical elements of a print mechanism for a high speed printer in which a type cartridge 12 shown in dotted outline is mounted on a swinging gate structure 14 which is pivotally mounted on a frame 13 by means of a pivot 15 at one end so as to permit manually swinging the gate structure 14 in a horizontal plane between a closed operating position as shown to an open position for permitting the insertion and removal of a form or forms 16 shown in dotted outline, upon which a printing operation is to be performed.

The printer may be generally of the type disclosed in Patent 3,224,366 which issued on Dec. 21, 1965 to James 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 FIGURES 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 FIGURE 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 pushrod 26 which corresponds to the operating mechanism in the Cunningham patent hereinbefore referred to.

Instead of having fixed character bearing type elements as in the subject patent, the type elements 17 of the present application are formed on levers which are pivotally supported by means such as the pin 27 in type carrying members 28 which are disposed in a train arrangement as described in the Cunningham patent, on a rail 29 which guides the type members past the print line. A resilient impression control member 32 engages a portion of the 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, slidable supported on the frame 13, being located for movement toward and away from the type cartridge 12 by means of slots 26 which receive guide pins 28 secured to the frame 13. The platen 18 is biased to a retracted position by
means of springs 30 secured between pins 32 in the platen and pins 34 secured to the machine frame. Adjustment of the platen against the force of the springs 30 is secured by means of an eccentric cam adjusting member 36 which is rotatably supported by means of a shaft 38 and bears against the rear side of the platen 18. The shaft 38 may be rotatably supported on the frame 13 by means of suitable bearings, being for example, positioned in openings 39, as shown at one end of the frame. Means such as the retaining clip 37 is secured to the platen 18 by means of a screw 35 and partially surrounds a portion of the cam member 36 so as to provide positive retraction of the platen.

Operation of the platen adjusting cam 36 may be effected by means of a selector cam 40 which is secured to the shaft 38. The cam 40 is activated by being resiliently connected to a control handle 42 which is used to lock the type carrier gate 14, by means such as the spring 44, which is connected to a pin 45 secured to the selector cam 40 and to a pin 46 projecting from a portion of the control handle. The control handle 42 may be positioned by being rotatably mounted on the shaft 38 of the adjusting cam member 36. The pin 46 may be so located that when the control handle 42 is operated to the horizontal or open position as shown, the pin 46 engages a rear portion of the selector cam 40 to rotate the adjusting cam 36 clockwise to its most retracted position. The control handle 42 is rotated in a counterclockwise or upward direction, the hook member 48 engages the pin 50 and locks the gate in the closed position.

When the control handle 42 is moved in a counterclockwise or upward direction to lock the carrier gate in the closed position, the spring 44 connecting the control handle 42 and the selector cam 40 is stretched, and the selector cam 40 is urged in a counterclockwise direction as shown, rotating the adjusting cam 36 to advance the platen 18 towards the type carrier 12. Forward movement of the platen 18 is terminated by the engagement of a sensing member 68 carried by the platen, with the form in the machine. The sensing member 68 is adjustably positioned on a latch lever 64, which is rotatably disposed by means of a pin 66 on a support bracket 56 carried by the platen, to which it is secured by means of screws 58. The bracket 56 provides one bearing 57 for a shaft 52, the other end of which is supported by means of a bearing bracket 54 on the machine frame (this arrangement is possible by reason of the limited movement of the platen 18, which is on the order of .040-.050 inch). The shaft 52 carries a pawl 53 which is disposed to engage teeth 43 and lock the selector cam 40 against further movement when the sensing member 68 engages the form. The latch member 64 is biased in a counterclockwise direction as shown in FIGURE 2 by means of a spring 62 connected to an operating lever 60 carried at the other end of the shaft 52. The spring 62 normally urges the latch member 64 in a counterclockwise direction to the position shown in FIGURE 2 in which a stop 65 engages the surface of the platen. In this position, the latch lever 60 rests against a latch portion 67 of latch member 64, which prevents further counterclockwise rotation of the shaft 52, and maintains the pawl 53 clear of the teeth 43 on the selector cam.

With the control handle in the open position shown in FIGURE 1, the carrier gate 14 may be swung open on its pivot 15 to permit the insertion of a form or forms between the platen 18 and the type carrier 12. When the swinging type carrier gate 14 is closed, against the form 16, movement of the control handle 42 in an upward or counterclockwise direction (FIGURE 1) to lock the type carrier gate 14 results in counterclockwise rotation of the selector cam 40 by reason of the spring 44 which is connected to the control handle 42. As the selector cam 40 rotates in a counterclockwise direction, the cam adjusting member 36 rotates and forces the platen to advance against the form 16 in the printer. When the sensing member 68 engages the form, the latch lever 64 is rotated in a counterclockwise direction (FIGURE 1) removing the latch portion 67 from beneath the end of the latch lever 60 and permitting the spring 62 to move the latch member 64 in a downward clockwise direction. This brings the pawl 53 into engagement with the teeth 43 of the selector cam, and locks the cam adjusting member 36 against further advancing motion, thus leaving the platen in predetermined relation with the form in the printer. When the control handle 42 is rotating in a counterclockwise direction to release the swinging type carrier gate 14, the pin 46 projecting from the control handle 42 engages the rear surface of the selector cam 40 and rotates the selector cam in a clockwise direction thus rotating the adjusting cam 36 to its retracted position, and permitting the retaining clip 37 and biasing springs 30 to retract the platen 18 to its most retracted position in which it is capable of receiving the thickest of forms.

From the above description and the accompanying drawings, it will be apparent that provision has been made for automatically retracting the platen when the control handle is operated to release and permit opening the type carrier gate and adjusting the position of the platen in a front printer whenever the control handle is operated to lock the type carrier gate in the closed position to start a printing operation. Proper adjustment of the platen is automatically maintained for a wide variation in the thickness of the forms, and optimum operating conditions are maintained at all times without there being any danger of the type being damaged by closure of the gate on a form with the platen in the advanced position.

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 print control system for a printer having a frame with a swinging type carrier gate pivotally movable relative thereto in and out of a closed operating position pivotally supporting a type cartridge comprising a plurality of type bearing members movable along a print line of a document and with actuating means for effecting impacting between the members and the document to print on the document,

2. A platen control system as described in claim 1 characterized by the platen carrying sensing means movable when it engages and senses the thickness of a form positioned between the platen and the type cartridge to render the resilient connection ineffective to effect further movement of the operating means to advance the platen.

3. A platen control system as described in claim 2 characterized by the operating means comprising a rotatable cam member engaging the platen to move it relative to
5. The type cartridge in response to locking movement of the control handle.

4. A platen control system as defined in claim 3 characterized by a ratchet member movable with the cam member and pawl means controlled by movement of the sensing means to engage the ratchet member when a form is sensed against a portion of the carrier gate.

5. A platen control system as defined in claim 4 characterized by the sensing means including biasing means for the pawl means and a releasable latch element normally positioned to render the pawl biasing means ineffective, and is released by operation of the sensing member to enable the biasing means to activate the pawl to engage the ratchet member.

6. A platen control system as defined in claim 5 characterized by the gate locking handle being resiliently connected to the operating means for advancing the platen and having a stop member directly actuating the operating means to retract the platen when the lock handle is moved to release the gate.

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