May 6, 1969 J. E. HAWXHURST 3,442,210

PRINTER PLATEN CONTROL

Filed Dec. 20, 1967

Sheet 1 of 2

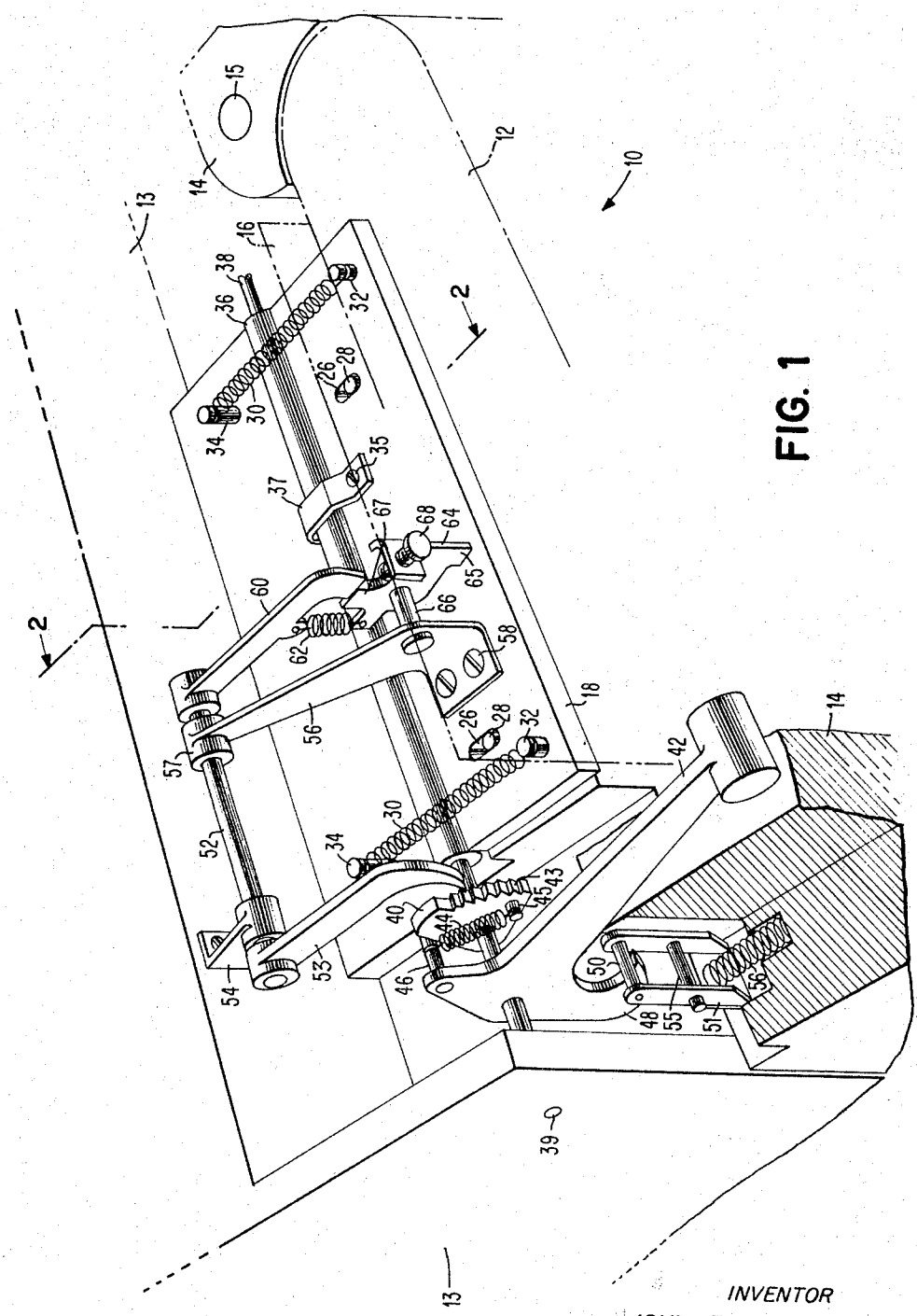


FIG. 1

INVENTOR
JOHN E. HAWXHURST

BY Francis V. Siolma
ATTORNEY

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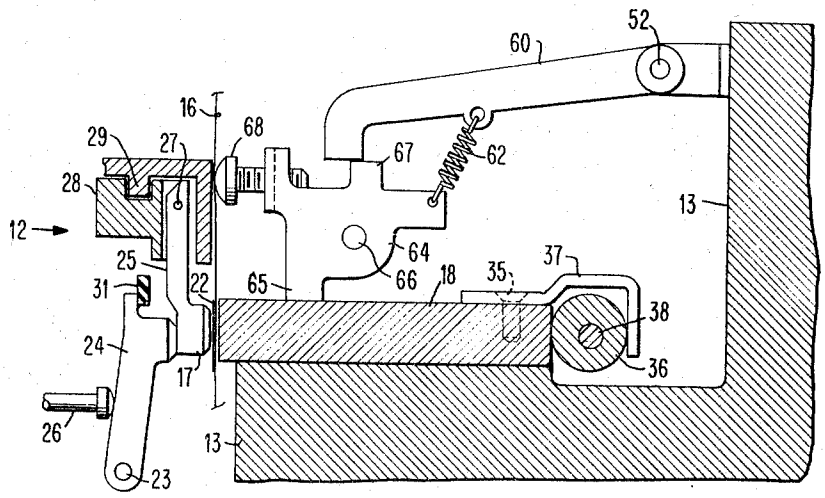


FIG. 2

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3,442,210

PRINTER PLATEN CONTROL

John E. Hawxhurst, Endwell, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y., a corporation of New York

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U.S. Cl. 101—407 6 Claims

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 predetetrmined 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 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 operating 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 **25** 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, slidably 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 mounted 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 **36** 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 provided with a depending hooked portion **48** for engaging a pin **50** on a latch member **51**, which is pivotally secured to the carrier gate **14** by means of a pivot **55** and provided with a compression biasing spring **56** for urging it to the position shown. When 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, 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 possibly because 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 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 **60** 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 downward or 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 the 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 into and out of a closed operating poistion 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,

of a platen movably supported on the frame to provide a backing surface for the document on the opposite side thereof from the type bearing members when the type carrier gate is moved into the closed position,

operating means movable to advance and retract the platen toward and away from the type carrier,

and means including a gate control handle operable to one position to lock the gate in the closed position and operable to another position to release the type carrier gate, said means being resiliently connected to the operating means to advance the platen toward the type bearing members of the type carrier gate as the handle is moved to the gate locking position.

2. A platen control system as defined in claim **1** characterized by the platen carrying sensing means operable 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 defined in claim **2** characterized by the operating means comprising a rotatable cam member engaging the platen to move it relative to

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.

References Cited

UNITED STATES PATENTS

1,737,878	12/1929	Gollnick et al.	101—407
1,906,304	5/1933	Barrett	197—149 X
2,936,704	5/1960	Hense	101—93
3,154,184	10/1964	Gallant et al.	197—149
3,155,032	11/1964	Antonucci	101—93
3,224,366	12/1965	Cunningham	101—93

WILLIAM B. PENN, *Primary Examiner.*

U.S. Cl. X.R.

101—93, 287; 197—149