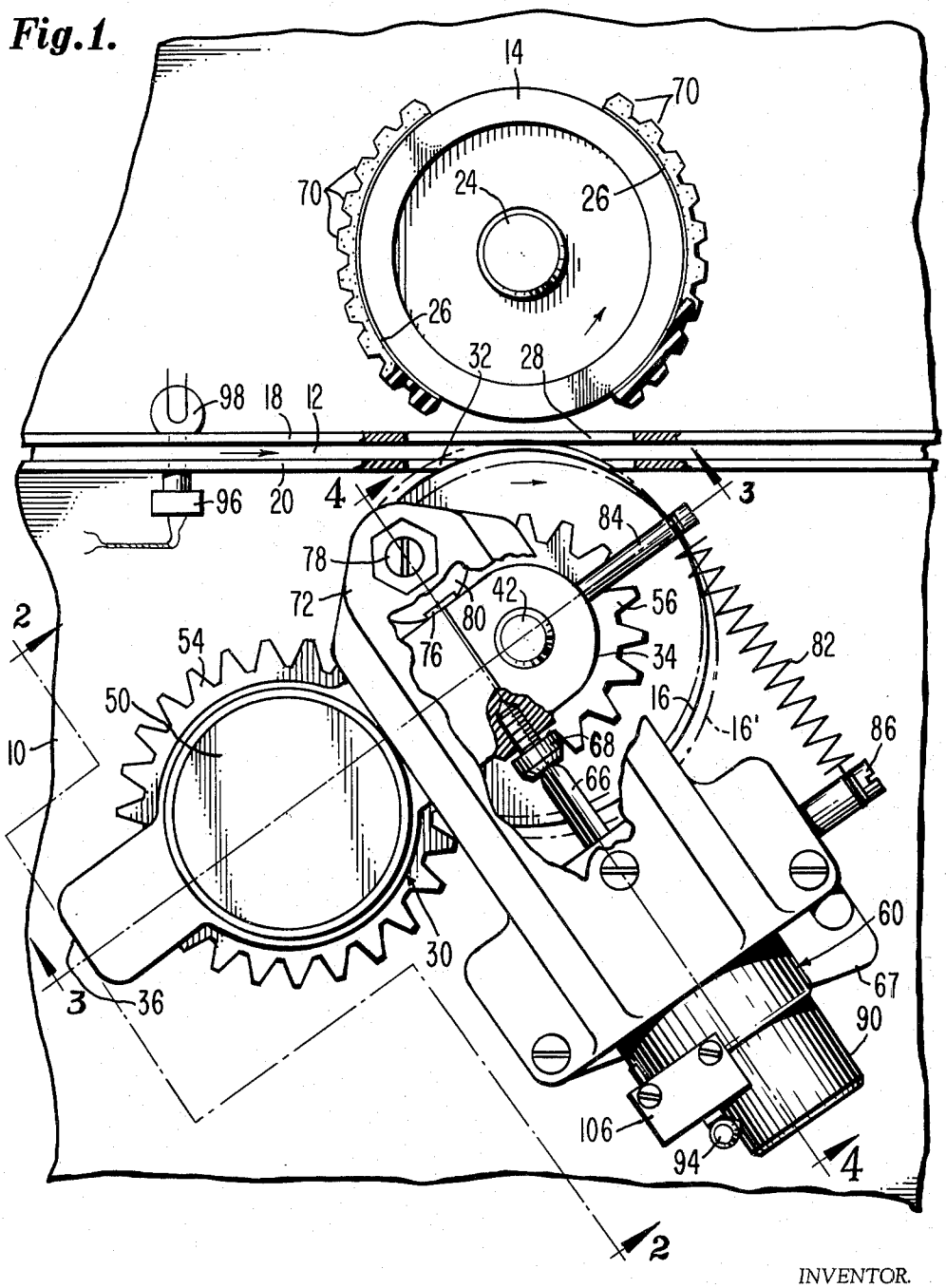
Nov. 16, 1965 R. KELLY 3,217,639

RETRACTABLE PLATEN CONTROL IN CHECK ENDORSING MACHINES

Filed July 18, 1963 3 Sheets-Sheet 1

Fig.1.



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RETRACTABLE PLATEN CONTROL IN CHECK ENDORSING MACHINES

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Fig. 2.

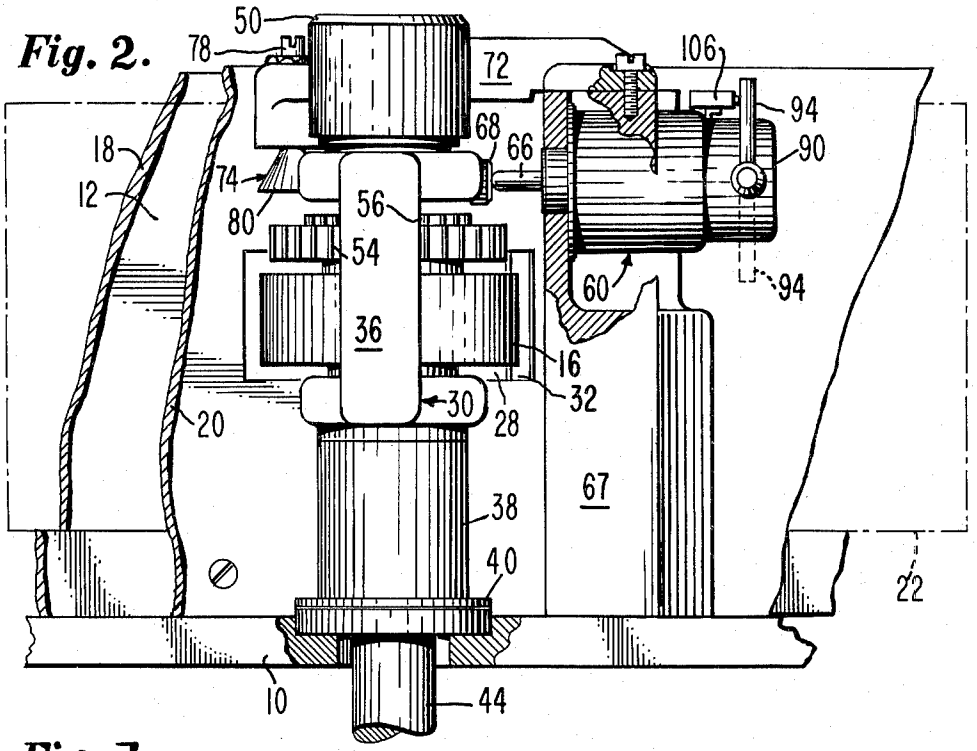
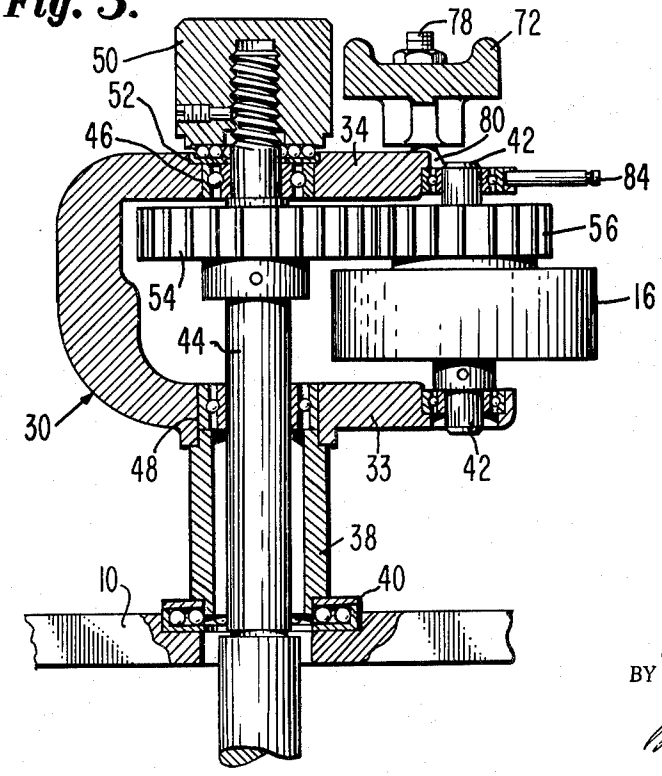


Fig. 3.



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RETRACTABLE PLATEN CONTROL IN CHECK ENDORSING MACHINES

Filed July 18, 1963 3 Sheets-Sheet 3

Fig.4.

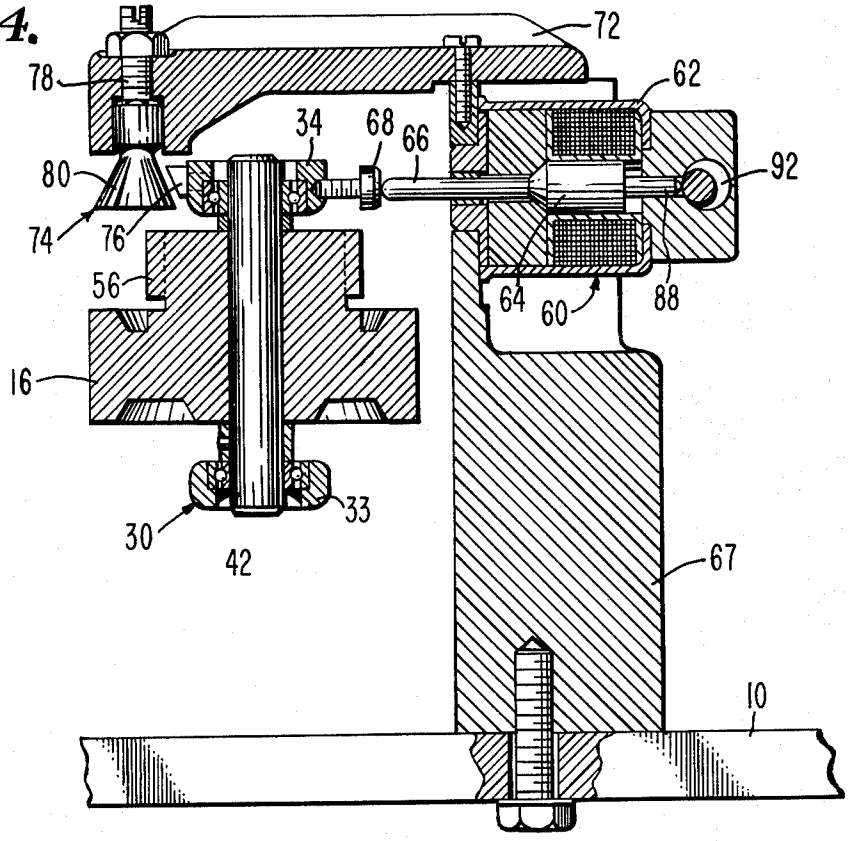


Fig. 6.

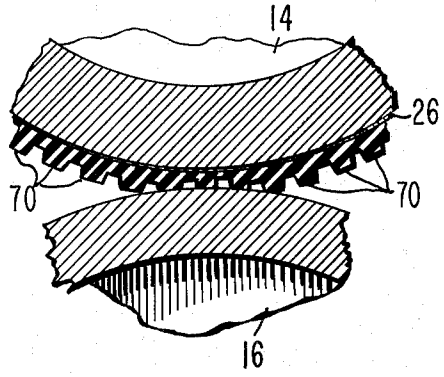
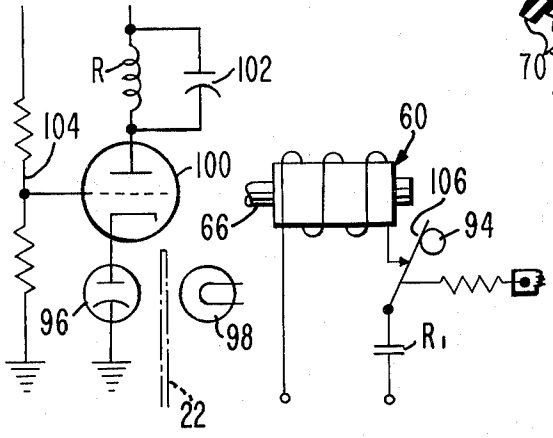


Fig. 5.



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3,217,639

RETRACTABLE PLATEN CONTROL IN CHECK ENDORSING MACHINES

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Filed July 18, 1963, Ser. No. 296,047
9 Claims. (Cl. 101—233)

This invention relates generally to printing apparatus and particularly to a roll-on type of printing apparatus.

One of the objects of the present invention is to provide an improved roll-on printing apparatus of the type in which a pivotally mounted roller platen is pivoted each printing operation from a retracted position to a printing position against a print wheel.

Another object of the invention is to provide a roll-on printing apparatus of the above mentioned character in which the platen is swung into effective printing position against the print wheel with provisions for reducing formerly encountered platen bounce and accompanying unwanted skip printing.

Specifically, it is an object of the invention to cushion the action of the platen as it is swung against the print wheel and counter the resultant reaction with a force of increasing magnitude without decreasing the printing speed of operation.

A further object of the invention is to provide a roll-on printing apparatus having a sheet guideway within which a platen is movable between retracted and print positions and to provide for further retraction of the platen without the guideway during non-printing operations so as to insure unobstructed passage of sheets including those which may have slips and paper clips attached thereto.

Other objects of the invention will become apparent from the following description, taken in connection with the accompanying drawings in which:

FIG. 1 is a plan view partly broken away and in section of a printing apparatus, embodying features of the invention;

FIG. 2 is an elevational view, partly broken away and in section, and taken in the direction of the arrows 2—2 of FIG. 1;

FIG. 3 is a vertical sectional view, taken along the line 3—3 of FIG. 1;

FIG. 4 is another vertical section view, taken along the line 4—4 of FIG. 1;

FIG. 5 is a diagrammatical illustration of a control circuit for the printing apparatus, and

FIG. 6 is an enlarged fragmentary plan view broken away and in section to illustrate the impact of a platen against a print wheel.

Referring to the drawings by characters of reference the printing apparatus shown comprises in general a supporting member or bed plate **10**, a sheet guideway **12**, a print wheel **14**, and a platen **16**. The guideway **12**, print wheel **14** and the platen **16** may be mounted on and be arranged above the bed plate **10**, the print wheel and platen being arranged opposite each other on opposite sides of the guideway **12**.

The guideway **12** may comprise a pair of vertically extending plates **18** and **20**, arranged in broadside spaced apart relationship to define a path of sheet travel. Sheets of paper, such as bank checks, as at **22** may be propelled by any well known suitable means along the guideway **12** to the print wheel and platen whence they may be transported to a check sorter (not shown).

As shown, the print wheel **14** is affixed to the upper end of a vertical driven shaft **24** and mounted on the periphery of the print wheel there is a pair of diametrically oppositely positioned print plates **26**. The print wheel **14** is positioned such that its periphery projects slightly into the guideway **12** which is provided with a

clearance aperture **28** to receive the wheel. In the present printing apparatus, the print wheel **14** is driven continuously, the surface speed of the wheel and the linear speed of the checks, passing along guideway **12** being synchronized.

The platen **16** is mounted on a horizontally rockable arm **30** for movement toward and/or away from the print wheel **14**, the platen **16** normally being at rest in the retracted position shown in full lines in FIG. 1. In this position, the platen **16** extends into the guideway **12** through a clearance aperture **32** in the guide plate **20** with the periphery of the platen proximate the periphery of the print wheel **14**, the spacing therebetween preferably being about 0.20 of an inch.

Preferably the arm **30** is in the form of a yoke having a lower horizontal leg **33**, an upper horizontal leg **34** and a vertical connecting web **36**. The yoke **30** is mounted on and affixed to the upper end of a rotatable tubular shaft **38** which seats at its lower end on the upper rotatable race of a bearing **40**, the lower race of which is securely retained in a recess in the upper surface of the bed plate **10**. The upper end of the tubular shaft **38** may be press fitted, or be otherwise suitably secured in and to the lower leg **33** of the yoke **30**. Adjacent their ends, the yoke legs **33** and **34** are provided with vertically aligning bores in which a driven shaft **42** is journalled, and affixed to shaft **42** is the platen **16** positioned between the yoke legs.

A vertical driving shaft **44** extends upwardly through the bed plate **10** and the tubular shaft **38** and is journaled in the lower and upper yoke legs **33** and **34** by suitable roller bearings **46** and **48**. An upper end portion of the driving shaft **44** projects above the upper yoke leg **34** and threaded onto the upper end of the shaft there is a supporting nut **50** for the shaft **44**. Interposed between the lower end of the nut **50** and the upper yoke leg **34** there is a thrust bearing **52** to reduce friction between the nut and the upper leg **34** of the yoke **30**. Affixed onto the driving shaft **44** between the lower yoke arm **33** and the upper yoke arm **34** there is a driving gear **54** which is in mesh with and drives a gear **56** that is affixed to the platen shaft **42**.

With reference to FIG. 1, it will be seen in plan view that the vertical axes of the print wheel **14** and the platen **16** are in a vertical plane substantially normal to the vertical plane of the path of sheet travel. In addition, the axis of the yoke **30** is located such that it is in a vertical plane with the axis of the platen **16**, the plane intersecting the path of sheet travel posteriorly to the print wheel and platen with respect to the direction of sheet travel and thus being at an acute angle to the path.

A power element, or solenoid **60** is provided to move the platen **16** from its normally retracted position, shown in full lines, FIG. 1, toward the print wheel **14** and comprises the usual coil **62** and electrically operated actuator or movable core **64**. The core **64** carries an extension rod **66**. The solenoid **60** is mounted on a supporting member or standard **67** which in turn is mounted on the bed plate **10**, as shown for example in FIG. 4. The solenoid **60** is arranged, as shown in FIG. 1, such that the rounded end of its plunger rod **66** engages a hardened abutment member **68** which is secured into the outer side of the upper yoke leg **34** near the end of the latter. That is, the longitudinal axis of the solenoid plunger rod **66** is substantially at a right angle to the vertical plane of the axes of the platen **16** and the yoke **30**.

In accordance with the invention, bouncing of the platen **16**, as it is thrust into impact with the print wheel **14** by the solenoid **60**, is eliminated for all practical purposes by the provision of platen cushioning means **70** and the force exerted by the solenoid core **64**. The cushioning means **70** is, in the present apparatus, in the form of

resilient print elements which may be rubber or rubberized material, bonded or otherwise suitably secured to the print plates **26**. The solenoid core **64** travels a longer distance than the distance between the normal position of the platen **16** and the print wheel **14** and the platen engages the print wheel before the maximum force of the solenoid is reached. As a consequence, the print elements **70** are slightly displaced by the platen and the reaction force of the resilient print elements is countered by the greater force of the solenoid which thus prevents platen bounce.

Rigidly mounted on the top of the standard **67** is one end of an extension member or arm **72** which extends over and across the yoke **30** to support a stop member **74** on the other side of the yoke from the solenoid **60**. The stop member **74** limits rotation of the yoke **30** by the solenoid **60** and thus limits movement of the platen **16** toward the print wheel **14**. The stop member **74** may be adjustably positioned with respect to a cooperating abutment member **76** that is secured in and to the adjacent side of the yoke arm **34**. In the present construction, the stop member **74** has an upper shank portion **78** screwthreaded into a vertical bore in arm **72** and a lower conical abutment portion **80** in the path of the yoke abutment member **76**. By raising and/or lowering the conical stop member **80**, it will be seen that the normal travel of the solenoid plunger **66** and thus platen **16** may be varied. The stop member **74** is adjusted such that travel of the platen **16** against the print elements will be limited to the displacement range of the particular resilient material of the print elements **70**.

Contact between the solenoid plunger rod **66** and the abutment **68** is maintained by a helical coil spring **82** which has one end attached to an extension member **84** of yoke leg **34** and the other end anchored by a pin **86** to the standard **67**. On the opposite end of the solenoid core **64** from the rod **66** there is another rod **88**, the end of which projects into a body **90** and engages a stop member **92** in the form of an eccentric. The stop member **92** is shown in normal position to limit retraction of the platen **16** to the aforementioned retracted position shown in full lines in FIG. 1. A handle **94** is provided for rotating the eccentric stop member **92** through 180° to extend the retractive movement of the plunger **66**, thus allowing the platen **16** to move further away from the platen to an ineffective position, designated **16'**, without the guideway **12**.

The solenoid **60** is activated in response to the approach of a check to the print wheel **14**, the solenoid being electrically connected to a photoelectric cell **96** which normally receives light from an electric lamp **98**. As shown in FIG. 1, the cell **96** and the lamp **98** are mounted on the bed plate **10** on opposite sides of the sheet guideway **12** such that each passing check, enroute to the printer, will block the light for a short interval from the cell.

As shown in FIG. 5, the circuit of the cell **96** is a well known circuit utilizing a triode **100** having its cathode connected to ground through the cell **96** and its anode or plate connected to a suitable potential by a conductor containing a relay coil R with a parallel capacitor **102**. A potential divider **104**, connected to a suitable biasing source ,provides for the proper potential on the triode grid so that the relay coil R will be energized in the well known manner when the light from lamp **98** is blocked by a check. The relay coil R has a pair of normally open contacts R1 in series circuit with the solenoid **60**, thus operatively connecting the solenoid and the photoelectric cell **96**.

Also in series circuit with the solenoid **60** there is a manually operable switch **106** which is actuated by the eccentric **92** when the limit of the plunger of solenoid **60** is changed from the normal setting shown to the setting which allows the platen to move to its ineffective position **16'**. Normally, the switch **106** is held closed by the eccentric operating handle **94** but is allowed to open when the handle is operated to allow the platen to move to its ineffective position, the purpose being to prevent energization of the solenoid **60** during the inactive or non-printing period.

Operation

As previously mentioned, the operating parts of the printing apparatus will be normally in the positions shown with the platen **16** in its retracted position as shown in full lines in FIG. 1. When a check enroute along guideway **12** passes and consequently blocks the light to the photoelectric cell **96**, the solenoid **60** is energized and, overcoming the return spring **82**, rocks the yoke **30** in a direction to swing the platen **16** against the print elements **70** of print wheel **14** with an impact force equal to the force exerted by the solenoid plus the force of inertia of the platen. As is well known, it is an inherent characteristic of solenoids that an interval, following their energization, is required during current buildup before they reach their full power. In the present arrangement, the platen **16**, is moved into impact with the print elements **70** as the solenoid force is increasing in magnitude and the resilient print elements function as a cushion to dissipate or store the impact force, the impact counter force stored in the resilient print elements being countered by the increasing magnitude of the force exerted by the solenoid, thus preventing bounce of the platen on the print wheel. That is, the differential between the solenoid force employed to swing the platen against the printing elements and the solenoid's peak force, is employed as the holding force to prevent platen rebound or bounce. The distance of travel of the solenoid plunger **64** is greater than the distance (0.20") between the print wheel and platen peripheries when the platen is in its normally retracted position and said distance of travel is determined by the stop member **80**. The stop member **80** is set in accordance with the displacement of the particular resilient material used for the print elements and is set such that displacement by the platen will be less than capacity displacement of the material, since if the material were displaced to its capacity, bouncing of the platen would occur.

Upon the passing of the trailing edge of the check beyond the photoelectric cell **96**, the solenoid **60** is de-energized whereupon the spring **82** pivots the yoke **30** away from the print wheel **14** and the solenoid plunger against its settable stop member **92** which positions the platen **16** again in its normally retracted position.

In certain types of check handling machines, all checks including those that don't require endorsing or other printing thereon are transported through the printer guideway enroute, for example, to a check sorting machine and these checks are usually handled in batches and frequently have other sheets and clips attached thereto which would normally engage and be slowed down by the print wheel and platen. In the present apparatus, when a batch of said checks are to be sent along the guideway **12** without receiving an imprint, the machine operator first, by means of the handle **94**, resets the eccentric stop member **92** by moving the handle through 180°. This allows the spring **82** to further retract the platen **16** to a position entirely without the guideway **12**, thus withdrawing the platen as an obstruction to the passing check.

What is claimed is:

1. In a printing apparatus, a sheet guideway, a print wheel positioned along said guideway, a rotatable platen positioned along said guideway for cooperation with said print wheel, said platen mounted for bodily movement relative to said print wheel from a print position adjacent said print wheel to a normally retracted position, a settable stop member normally limiting movement of said platen from said print wheel to said retracted position, an actuator operatively connected to said platen, said actuator operable on activation thereof to move said platen from said normally retracted position to said print position adjacent said print wheel, means urging said platen toward said stop member and effective upon deactivation of said actuator, said settable stop member settable at the

will of an operator to extend its distance from said print wheel to establish an inactive position of said platen, a first control member operatively connected to said actuator to effect actuation thereof and responsive to the passing of a sheet along said guideway, and a second control member operatively connected to said actuator and operable to disable said actuator irrespective of the operation of said first control member.

2. In a printing apparatus, a sheet guideway along which sheets are fed singly on edge, a print wheel mounted for rotation about an axis on one side of said guideway and projecting into the latter, a driving shaft positioned laterally of the path of sheet travel on the other side of said guideway from said print wheel, an arm pivotally mounted to rotate about the axis of said driving shaft and extending therefrom toward said guideway, a platen rotatably mounted on said arm in spaced relation to and driven by said driving shaft, yieldable means urging said arm to pivot the latter in a direction to move said platen away from said print wheel, a settable stop member normally set to limit movement of said arm by said yieldable means to position said platen in a normally retracted position with the platen periphery projecting within said guideway, a normally inactivated actuator operatively connected to said arm, said actuator operable upon activation thereof to pivot said arm in a direction to move said platen into cooperative printing position with said print wheel, and means operable to set said settable stop member in another position for movement of said platen by said yieldable means to an ineffective position without said guideway, a control member operatively connected to said actuator to effect actuation thereof and responsive to the passing of a sheet along said guideway, and a control member operatively connected to said actuator and operable to inactivate said actuator and operable by the setting of said settable stop member in said another position.

3. In a printing apparatus, a sheet guideway along which sheets are fed singly, a print wheel mounted for rotation about an axis on one side of said guideway and projecting partway into the latter, a driving shaft positioned on the other side of said guideway from said print wheel, an arm pivotally mounted for rotation about the axis of said driving shaft and extending therefrom toward said guideway, a rotatable platen mounted on said arm on the other side of said guideway from and opposite said print wheel, a stationary mounting, an electrically operated actuator supported on said mounting and normally inactivated, said actuator abutting said arm transversely thereto and on activation rectilinearly movable to pivot said arm in a direction to move said platen from a normally retracted position to an effective printing position adjacent said print wheel, yieldable means urging said platen toward the retracted position and maintaining contact between said arm and said actuator, a settable stop member normally limiting retraction of said print wheel to said retracted position, manually operable means to set said settable stop member in another position further from said guide member to effect limitation of movement of said platen to an ineffective position, a switch member operatively connected to and for effecting actuation of said actuator in response to the passing of a sheet along said guideway, and a second and normally closed switch member controlling operation of said actuator and movable to open position by and upon the setting of said settable stop member in said another position by said manually operable means.

4. In a printing apparatus, a sheet guideway along which sheets are fed singly, a print wheel mounted for rotation about an axis on one side of said guideway and projecting partway into said guideway, a driving shaft positioned on the other side of said guideway from said print wheel, an arm pivotally mounted for rotation about the axis of said driving shaft and extending therefrom toward said guideway, a rotatable platen mounted on said arm in spaced relation to said shaft and driven by the latter opposite said print wheel, a stationary mounting member, a normally inactivated electrically operated actuator supported by said mounting member, said actuator abutting said arm and on activation moving to pivot said arm in a direction to move said platen toward and into printing position with said print wheel, an extension member supported by said mounting member and overlying said arm, an adjustable stop member on said extension member to engage said arm and limit rotative movement of said platen by said actuator to the printing position, yieldable means operable to pivot said arm in the opposite direction upon deactivation of said actuator, a settable stop member mounted on said stationary mounting member and normally set to stop said actuator to limit movement of said platen by said yieldable means to a retracted position projecting partway into said guideway, manually operable means to set said stop member to extend retraction of said platen by said yieldable means to an ineffective position without said guideway, and switch means responsive to the passage of a sheet along said guideway and operatively connected to said actuator to activate the latter.

5. In a printing apparatus, a sheet guideway along which sheets are fed singly on edge, a print wheel mounted for rotation about an axis on one side of said guideway and projecting partway into said guideway, a driving shaft positioned on the other side of said guideway from said print wheel, an arm pivotally mounted for rotation about the axis of said driving shaft and extending therefrom toward said guideway, a rotatable platen mounted on said arm in spaced relation to said shaft and driven by the latter opposite said print wheel, a stationary mounting member, a normally inactivated electrically operated actuator supported by said mounting member, said actuator abutting said arm and on activation moving to pivot said arm in a direction to move said platen toward and into printing position with said print wheel, an extension member supported by said mounting member and overlying said arm, an adjustable stop member on said extension member to engage said arm and limit rotative movement of said platen by said actuator to the printing position, yieldable means operable to pivot said arm in the opposite direction upon deactivation of said actuator, a settable stop member mounted on said stationary mounting member and normally set to stop said actuator to limit movement of said platen by said yieldable means to a retracted position projecting partway into said guideway, manually operable means to set said stop member to extend retraction of said platen by said yieldable means to an ineffective position without said guideway, switch means responsive to the passage of a sheet along said guideway and operatively connected to said actuator to activate the latter, and a second switch member activated by the manual setting of said settable stop member to control activation of said actuator by said first-mentioned switch member.

6. In a printing apparatus, a guideway along which a sheet is fed, a print wheel positioned along said guideway on one side of a path of sheet travel, a rotatable platen positioned on the other side of the path of sheet travel, said platen having a first retracted position projecting into said guideway and movable further into said guideway toward said print wheel to press a sheet thereagainst, an actuator operatively connected to said platen and activatable to move said platen to said print wheel, yieldable means biasing said platen to the first retracted position thereof, a first control member operatively connected to said actuator to control activation thereof and responsive to a sheet passing along said guideway, a settable stop member positioned to stop movement of said platen by said yieldable means at said first retracted position and settable to another position to effect retraction of said platen by said yieldable means to a second retracted position without said guideway, and a second control member operatively connected to said actuator and operable to disable said actuator irrespective of the operation of

said first control member and responsive to the setting of said settable member in said another position.

7. In a printing apparatus, a guideway along which a sheet is fed, a print wheel on one side of said guideway including printing elements on the periphery of the print wheel, a rotatably driven platen on the other side of said guideway, said platen having a normally retracted position a predetermined distance from the periphery of said print wheel and mounted for accelerated movement to said print wheel to strike a sheet against said printing elements, a normally inactive electrically operated actuator operatively connected to said platen and operable to move said platen with accelerated movement and impact force to said print wheel, said actuator on activation thereof exerting a force increasing in magnitude to a predetermined potential force, a stop member positioned to stop movement of said platen prior to the attainment of said potential force, resilient means positioned between said printing elements and said print wheel to receive and store the impact force of said platen and limited in displacement by said stop member to effect a reaction force less than said potential force, and a switch member operatively connected to said actuator to activate the latter and responsive to the passing of a sheet along said guideway.

8. In a printing apparatus, a guideway along which a sheet is fed, a print wheel positioned on one side of said guideway and having resilient printing elements on the periphery thereof, a rotatable platen on the other side of said guideway, said platen having a normally retracted position a predetermined distance from said print wheel and mounted for accelerated movement to strike a sheet and press it against said printing elements with an impact, an electrically operated rectilinearly movable actuator operatively connected to said platen and normally de-energized, said electrically operated actuator upon energization thereof being operable to thrust said platen against said resilient printing elements with a force increasing in magnitude to a predetermined peak force, a stop member positioned in alignment with and for stopping said actuator to stop movement of said platen to effect a predetermined partial displacement of said resilient printing elements to absorb the impact force of said platen against said printing elements and prior to the attainment

of said peak force by said actuator, said peak force holding said platen against said printing elements, and a switch member operatively connected to and controlling operation of said actuator in response to the passing of a sheet along said guideway.

9. In a printing apparatus, a guideway along which a sheet is fed, a print wheel member positioned on one side of said guideway and having resilient printing elements, a rotatable platen member positioned on the opposite side of said guideway, one of said members having a normally retracted position a predetermined distance from the other member and movable with increasing velocity to engage the resilient print elements with the platen member, an electrically operated actuator operatively connected to said one member, said actuator on activation thereof operable with a force increasing in magnitude to engage said members with an impact tending to effect a rebound of said one member by the counter force stored in said resilient printing elements, said actuator force increasing to a predetermined potential force, a stop member positioned to stop movement of said one member by said actuator prior to the attainment of said predetermined potential force by said actuator and also limit displacement of said resilient printing elements to effect a corresponding counter force by the resilient printing elements less than said potential force, a first switch member operatively connected to said actuator to activate the latter and responsive to the passing of a sheet past a predetermined point of said guideway, and a second switch member operatively connected to said actuator and operable to disable said actuator irrespective of the operation of said first switch member.

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