Sept. 13, 1960 J. M. NESSEL ET AL 2,952,349

PAPER FEEDING DEVICE

Filed March 7, 1958 3 Sheets-Sheet 1

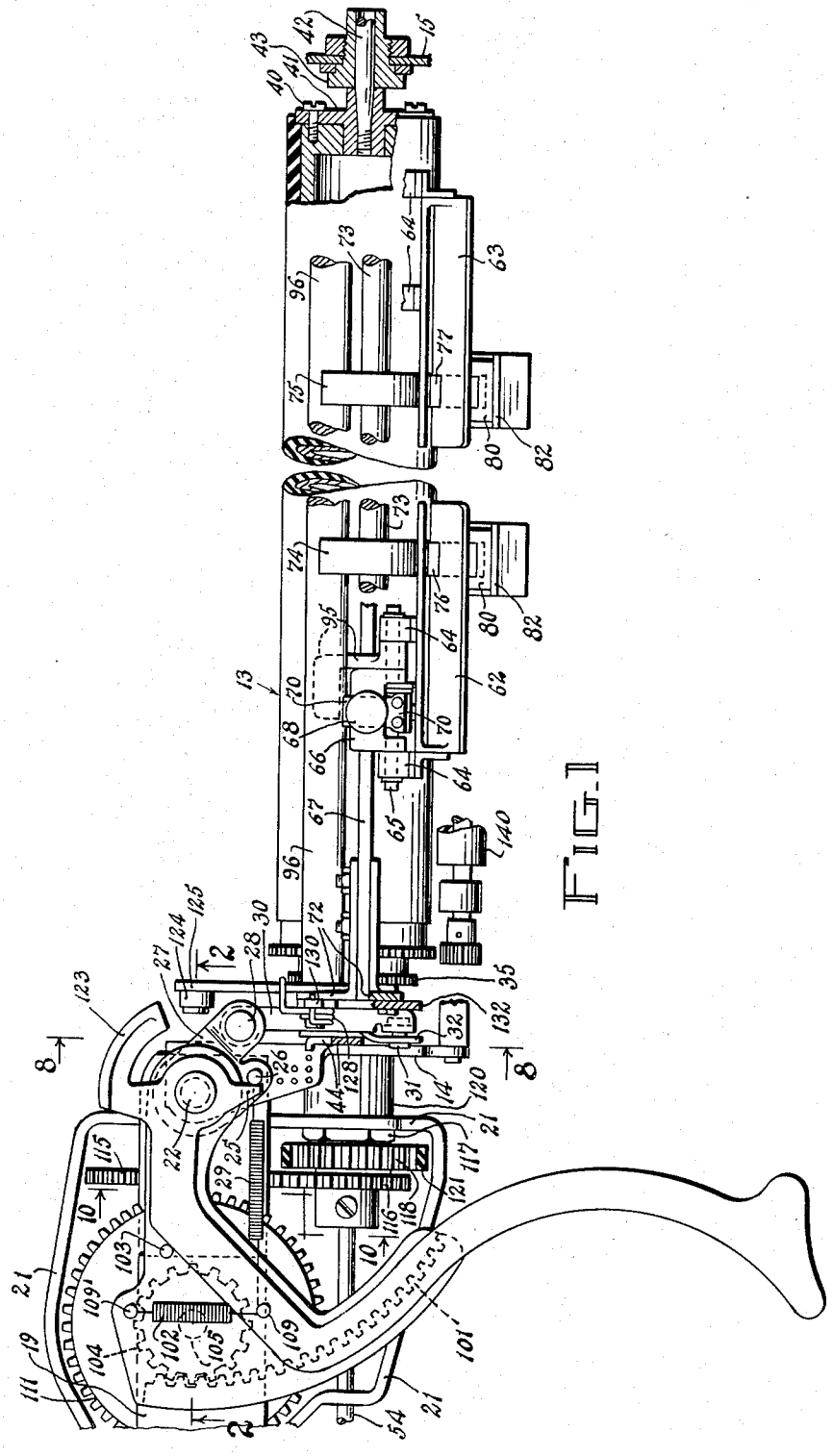


FIG. 1

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Filed March 7, 1958

3 Sheets-Sheet 2

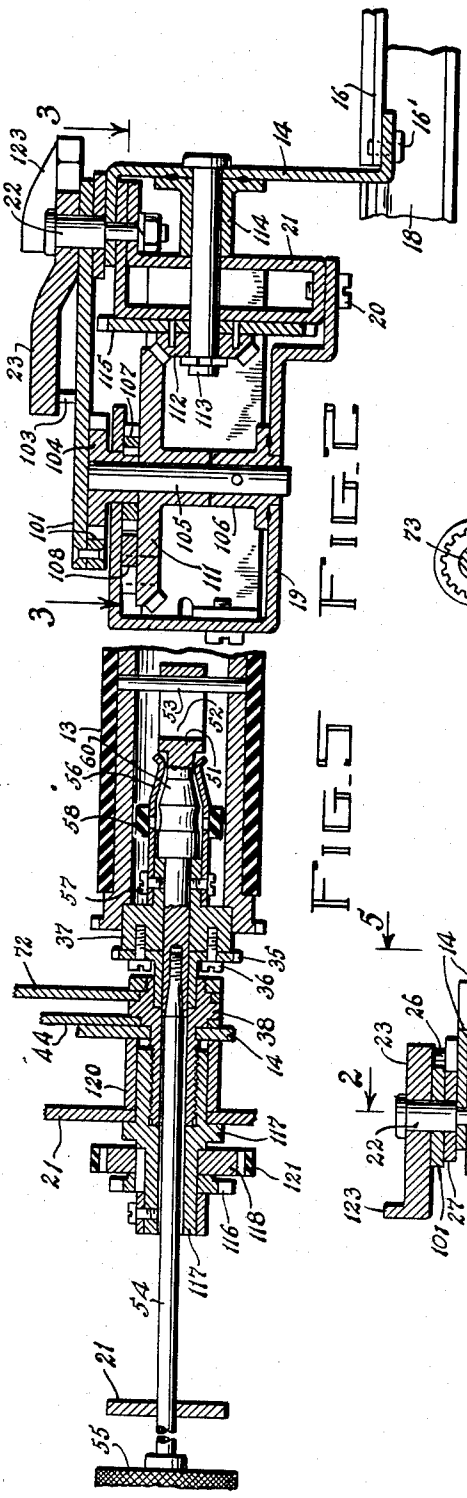


FIG. 2

FIG. 5

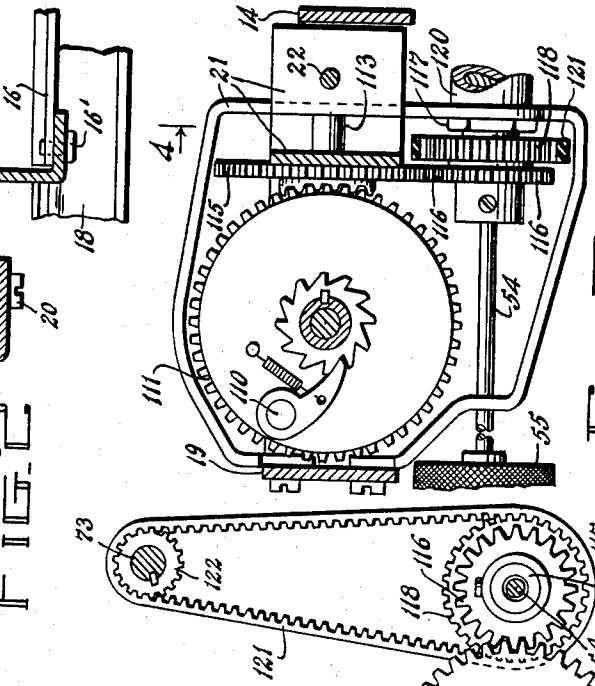


FIG. 3

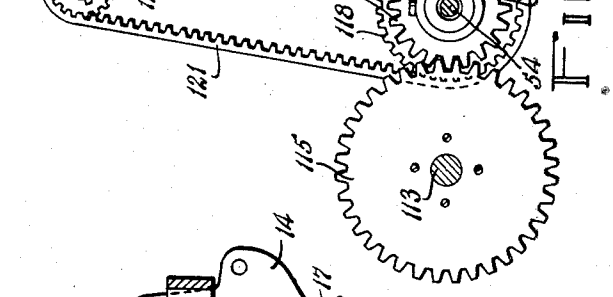


FIG. 10

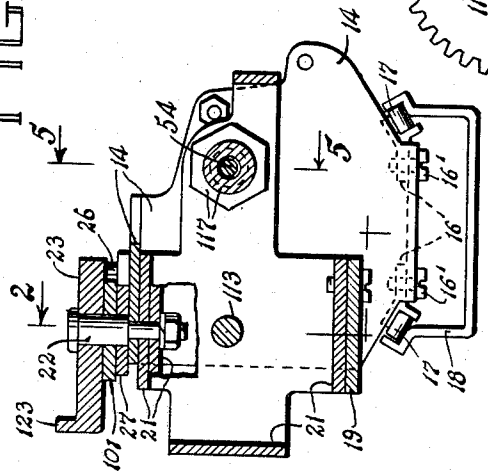


FIG. 4

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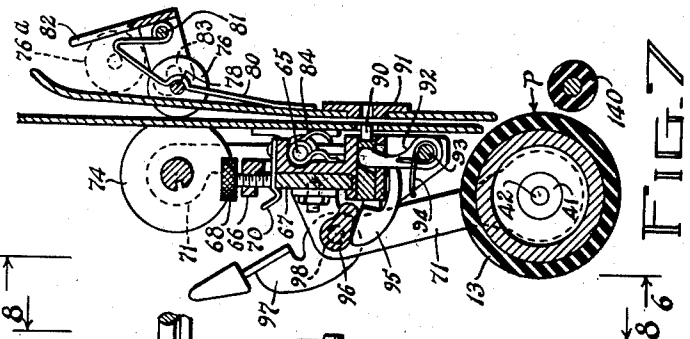


FIG. 7

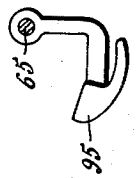


FIG. 9

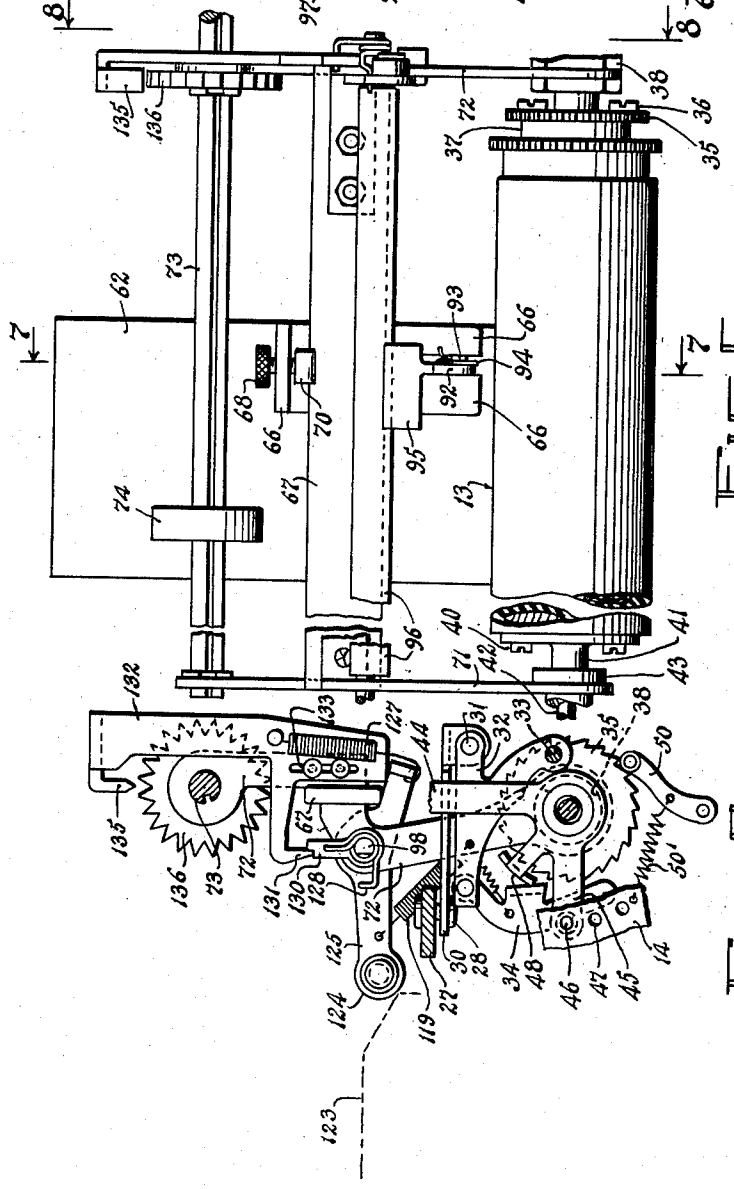


FIG. 6

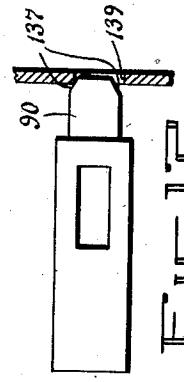


FIG. 12

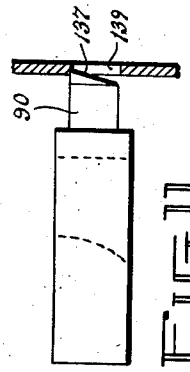


FIG. 11

FIG. 8

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2,952,349

PAPER FEEDING DEVICE

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12 Claims. (Cl. 197—127)

This invention relates to printing machines such as typewriters, accounting machines, billing machines, etc., and has particular reference to means for automatically line positioning a work sheet on which information is to be typed.

In accounting and similar work, work sheets, such as statement forms, are periodically placed in the accounting machine and information is printed thereon on lines located below previously printed lines. In this way, numerous entries may be made from time to time on successive lines of the same sheet.

Several devices have been developed for locating a newly placed work sheet in proper position in the accounting machine to receive a new line of print directly below a previously printed line. Such devices, in general, incorporate a punch for perforating the sheet at a predetermined position relative to the last printed line. In certain of such arrangements, the paper is front fed by hand until the locating hole is sensed by a suitable locating pin or the like whereupon the sheet is arrested in order to proceed with the printing. In other arrangements, electric circuit sensing means are utilized to sense the locating hole and arrest the paper feed. The former arrangements, although generally satisfactory, require a certain amount of dexterity and time in order to properly manually position the paper relative to the line sensing means, while the latter mechanisms require a considerable amount of electrical and associated mechanical equipment in order to properly arrest the paper feeding mechanism.

The principal object of the present invention is to provide an automatic mechanical line positioning device for replaced work sheets in an accounting machine or the like.

Another object is to incorporate a relatively simple automatic line positioning mechanism for replaced work sheets in a printing machine having a shiftable paper carriage.

Another object is to provide an automatic line positioning device for replaced work sheets in which the spacing between lines may be selectively varied.

A further object is to utilize the usual line spacing handle of a shiftable carriage machine to operate a paper injecting mechanism.

The manner in which the above and other objects of the invention are accomplished will be readily understood on reference to the following specification when read in conjunction with the accompanying drawings, wherein:

Fig. 1 is a plan view of an accounting machine paper carriage embodying a preferred form of the present invention.

Fig. 2 is a vertical sectional view through the drive transmission for the paper injecting mechanism and is taken along the line 2—2 of Figs. 1 and 4.

Fig. 3 is a sectional plan view of the drive transmission and is taken along the line 3—3 of Fig. 2.

Fig. 4 is a sectional view taken along the line 4—4 of Fig. 3.

Fig. 5 is a longitudinal sectional view through the left hand portion of the platen and variable feed clutch associated therewith, and is taken along the line 5—5 of Fig. 4.

Fig. 6 is a rear view, with parts broken away, of the platen and paper support, and is taken substantially along the line 6—6 of Fig. 7.

Fig. 7 is a transverse sectional view through the carriage and is taken substantially along the line 7—7 of Fig. 6.

Fig. 8 is a transverse sectional view taken along line 8—8 of Figs. 1 and 6.

Fig. 9 is a detailed elevation view of the punch control cam arm.

Fig. 10 is a transverse sectional view taken along the line 10—10 of Fig. 1, illustrating the drive connections for the paper feed rolls.

Fig. 11 is an enlarged side view of the combined punch and locating pin shown in Fig. 7.

Fig. 12 is an enlarged plan view of the combined punch and locating pin.

Referring to the drawings, the carriage, in general, embodies a platen 13 rotatably supported, in a manner to be described in detail later, by spaced side frame plates 14 and 15. The latter are integrally fastened as by screws 16′ to carriage base bars 16 (Fig. 4), which are supported for endwise movement on rollers 17, movable along a fixed track frame 18 which is suitably supported, in a manner not shown, on the accounting machine frame.

A gear box 19 is provided at the left hand end of the carriage and is secured by screws 20 to a box frame 21, which, in turn, is secured to the frame plate 14 partly by a combined clamp screw and pivot pin 22.

A combined paper feed and carriage shift handle 23 is fulcrumed on the pin 22 for rocking movement in either direction about its medial position, illustrated in Fig. 1. Counterclockwise movement of the handle from its medial position is effective to cause a line spacing movement of the platen and to shift the carriage to the right incidental to starting a new line of print. Clockwise movement of the handle from its medial position is effective to inject a work sheet, such as a statement form, over the platen until it is in proper position for printing a new line of type as will be described later.

Describing first the line spacing mechanism operated by the handle 23, a nose 25 on the latter normally engages a pin 26 mounted on a plate 27 also fulcrumed on the pivot pin 22 below the handle. A spring 29 tensioned between the pin 26 and a pin 26′ carried by the handle 23 normally holds the plate 27 in its illustrated position with pin 26 abutting the nose 25. The plate 27 is pivotally connected at 28 to a link 30 (see also Fig. 8) which, in turn, is pivoted at 31 to an arm 32. The latter is fulcrumed at 33 on the frame plate 14 and pivotally supports at its outer end a pawl 34. The latter is adapted to engage the teeth of a ratchet 35 fastened by screws 36 to a bushing 37 (see also Fig. 5). The latter supports the left hand end of the platen 13 for rotation thereon while the hub of the ratchet wheel 35 is journaled in a flanged sleeve 38 clamped to the frame plate 14 to thus rotatably support the left hand end of the platen.

The right hand end of the platen has attached thereto, as by screws 40, a flanged hub 41 having threadably secured therein one end of a shaft 42 journaled in a sleeve 43 attached to the right hand frame plate 15.

A line space selector lever 44 (Figs. 5 and 8) is journaled on the sleeve 38 and has an arm 45 carrying a round headed rivet 46 adapted to snap into one of three

holes 47 formed in the side plate 14, to thereby detent the lever 44 in any of three positions. The lever 44 is provided with a second arm 48 which is formed to overlie the teeth of the ratchet wheel 35. The pawl 34 normally rides on the periphery of the arm 48 and by positioning the lever in different ones of its three settings, the arm 48 selectively delays engagement of the pawl with the teeth of the ratchet whereby to cause the pawl to advance the same, and thus the platen, one, two or three increments during counterclockwise rocking of the handle 23. As the pawl 34 reaches the end of its stroke, the arm 32 will engage the periphery of the sleeve 38 so that further pivotal movement of the handle 23 will be limited but continued manual pressure on the handle toward the right will be effective to shift the carriage to the right preparatory to a new line of print.

A centralizer 50 is yieldably held in engagement with the ratchet wheel 35 by a spring 50' whereby to locate the platen in any position to which it has been advanced.

Means are provided for selectively enabling manual variable line spacing of the platen. For this purpose, a plunger 51 is slidably mounted in axial openings formed in the bushing 37 and ratchet wheel 35. A longitudinal slot 52 is formed in the right hand end of the plunger and embraces a transversely extending pin 53 fastened in the platen 13. A shaft 54 threadably fastened in the left hand end of the plunger terminates in a knob 55 whereby the platen may be rotated independently of the handle 23.

The flange 37 has spring fingers 56 attached thereto by screws 57. The fingers carry friction buttons 58 engageable with the inner periphery of the platen 13 and the outer ends of the fingers engage a conical camming surface 60 formed on the plunger. Thus, when the knob 55 is pressed inward, the fingers 56 will be deflected outward radially, causing the buttons 58 to grip the platen so that the latter will be secured as a unit to the ratchet wheel 35. Withdrawal of the knob 55 into its position illustrated will permit rotation of the platen 13 through the pin 53, independently of the ratchet wheel 35.

The carriage is provided with means for front feeding a statement sheet or the like, and for this purpose a pair of paper feed chutes 62 and 63 are provided. The latter extend substantially tangentially of the periphery of the platen 13, and are each provided with spaced bearing blocks 64 pivotally mounted on a pin 65 carried by a clamp block 66. The clamp block of each chute is slideable on a support bar 67 and is clamped in position by a clamp screw 68 bearing against a leaf spring 70 carried by the respective block.

The bar 67 is supported at its ends by swingable support arms 71 and 72 (see also Figs. 1 and 5) fulcrumed on the sleeve 38 and bushing 43, respectively.

The arms 71 and 72 extend upwardly to form bearings for a feed shaft 73 on which are splined rubber tired rollers 74 and 75 extending through openings in the rear walls of respective ones of feed chutes 62 and 63.

The rollers 74 and 75 engage pressure rollers 76 and 77, respectively, each extending through an opening in the front wall of the respective chute and carrying a short axle 78 which is held in place by a leaf spring 80 suitably attached at its lower end to the front wall of the chute. The upper end of the spring 80 carries a pin 81 forming the pivot for a bail 82, the legs of which have slots 83 embracing the opposite ends of the axle 78. By rocking the bail 82 clockwise from its position illustrated in Fig. 7, the pressure roller, i.e. 76, is moved into its dot and dash position 76*a*, permitting a torsion spring 84 extending between the clamp block 66 and the chute to rock the chute counterclockwise away from the periphery of the platen to permit back feed threading of paper over the platen, or the like.

The carriage is provided with a paper punch for enabling a line indicating hole to be punched at one side of the paper in a predetermined relation relative to a printed line. When the sheet is withdrawn and later again injected through the chutes 62 and 63, the punch will act as a sensing element to sense the position of the punched hole and thereby arrest the injecting mechanism.

The punch, indicated at 90 (see also Figs. 11 and 12), is slideably mounted in one of the chute supporting blocks 66 and cooperates with an opening formed in a die block 91 suitably attached to the front wall of the chute.

An arm 92 is pivotally supported at 93 by a depending portion of the chute block and is keyed into an opening formed in the punch 90. The arm 92 is urged counterclockwise by a light torsion spring 94 to normally locate the punch out of the paper passage in the chute, as shown in Fig. 7. The arm 92 is engaged by a cam arm 95 (see also Fig. 9), pivoted on the pin 65. The latter is engaged by a cam bar 96 which extends between the aforementioned arms 71 and 72 and is provided with trunnion bearing portions 98 journaled in bearings formed in such arms. An actuating arm 97 is attached to the cam bar 96 and when swung forwardly, causes the cam bar 96 to actuate the cam arm 95 and thus force the punch 90 to the right to punch an opening in the paper.

Although only one punch is disclosed, a similar punch could obviously be mounted on the second chute.

Describing now the means for injecting a paper sheet into proper printing position relative to a printing station P and to a line previously printed on the sheet, the handle 23 overlies a gear sector 101, also fulcrumed on the pivot pin 22. A spring 102 is tensioned between a pin 109 on the handle and a pin 109' on the gear sector to normally hold the handle in its medial position against a pin 103 extending from the sector. The pin 109' also extends from the bottom of the gear sector and abuts against a pinion 104 thereby preventing the sector from being drawn counterclockwise.

The gear sector 101 meshes with the pinion 104 rotatably mounted on a stub shaft 105 fixed to a boss 106 (Fig. 2) integral with the gear housing 19. A ratchet wheel 107 is suitably keyed to the hub of the pinion 104 and is engaged by a spring pressed pawl 108 (Fig. 3) pivotally mounted at 110 on a bevel gear 111 also freely mounted on the stub shaft 105. The gear 111 meshes with a second bevel gear 112 which is rotatably mounted on a stub shaft 113 extending through a boss 114 suitably attached to the side frame plate 14. The beveled gear 112 is attached to a gear 115 which meshes with a gear 116 rotatably mounted on a stationary sleeve 117 (see also Fig. 5) and keyed to a cog wheel 118 also journaled on the sleeve.

The sleeve 117 is threadably attached to the aforementioned sleeve 38 and is effective to clamp a portion of the gear box 19 against a spacer 120 interposed between the gear box wall and the frame plate 14 and thereby to also clamp the plate 14 between the spacer and the sleeve 38.

A flexible cog belt 121 extends over the cog wheel 118 and over a second cog wheel 122 keyed on the paper feed roll shaft 73 whereby to establish a driving connection between the gear 115 and the drive rolls 74 and 75 splined on the shaft 73.

The handle 23 is provided with a cam formation 123 which is effective when the handle is rocked a predetermined amount in a clockwise direction from its medial position to engage a roller 124 (Figs. 1 and 8) on a lever 125 which is pivoted on one of the trunnion bearing extensions 98 of the cam bar 96 and is normally held in its illustrated position by a tension spring 119. A light torsion spring 128 is attached between the lever 125 and a latch arm 130 integrally attached to the cam bar trun-

nion 98. The spring 128 is slightly stronger than the aforementioned torsion spring 94 (Fig. 7).

The latch 130 normally lies under a trip finger 131 extending from a stop bar 132. The latter is guided for vertical movement on the arm 72 by a pin and slot connection 133 and is urged downwardly by a tension spring 127 tensioned between the stop bar 132 and the lever 125.

When a work sheet is fitted within the guide chutes 62 and 63 in a position wherein the lower edge of the paper rests at the intersections of the rollers, i.e. 74 and 76, and the handle 23 is rocked clockwise, the rollers 74 and 75 will be rotated to advance the paper downwardly through the chutes. After the lower edge of the paper has passed below the punch 90, the cam formation 123 will be effective to rock the lever 125. thus stressing the torsion spring 128 to urge the latch 130 and the cam bar 96 clockwise to lightly urge the punch 90 against the surface of the paper as it advances downwardly onto the periphery of the platen 13. The pressure exerted by the punch 90 against the surface of the paper at this time will be insufficient to punch the latter or to impede its downward progress. However, when the paper has traveled downwardly until a previously punched hole comes opposite the punch, the spring 128 will become effective to move the punch into the hole, thereby rocking the latch 130 clockwise out from under the trip finger 131. The spring 127 having been stressed by the rocking of lever 125 will now become effective to lower the bar 132, causing a latching tip 135 thereon to engage a notched wheel 136 keyed on the shaft 73 so as to arrest the latter and thus prevent further feeding of the paper.

As will be seen particularly in Figs. 11 and 12, the leading edge of the punch 90 is chamfered at 137 to permit ready entry of the same into a previously punched hole, as indicated at 139, in the paper even though the hole may be slightly out of registry as it moves over the punch.

Suitable pressure rollers, as at 140, are provided for pressing the paper against the surface of the platen. Such rollers may normally be located out of engagement with the platen as shown in Fig. 1, permitting front feed threading of the paper over the platen. Subsequently, the rollers are spring pressed into engagement (by means not shown) to enable the platen to feed the paper thereover past the printing station.

Also, means (not shown) may be provided to detent the chute supporting arms 71 and 72 in their positions shown in Fig. 7 or in their alternate counterclockwise rocked positions.

Although we have described our invention in detail in its preferred embodiment and have therefore used certain specific terms and languages herein, it is to be understood that the present disclosure is illustrative rather than restrictive and that certain changes and modifications may be made without departing from the spirit or scope of the claims appended hereto.

Having thus described the invention, what we desire to secure by United States Letters Patent is:

1. In a printing machine having a rotatable paper advancing platen, the combination comprising a paper injecting device for injecting a sheet of paper past said platen, a line spacing mechanism for incrementally rotating said platen, a manually operable handle, means supporting said handle for movement in either of opposite directions from a medial position, means responsive to said handle upon movement thereof in one direction from said medial position for actuating said line spacing mechanism, and means responsive to said handle upon movement thereof in the opposite direction from said medial position for actuating said injecting mechanism.

2. In a printing machine having a frame, a paper carriage supported by said frame for lengthwise movement, and a rotatable paper advancing platen carried by said carriage, the combination comprising a paper injecting device carried by said carriage for injecting a sheet of paper past said platen, a line spacing mechanism carried by said carriage for incrementally rotating said platen, a manually operable handle, means on said carriage supporting said handle for movement in either of opposite directions from a medial position, means responsive to said handle upon movement thereof in one direction from said medial position for actuating said injecting device, and means responsive to said handle upon movement thereof in the opposite direction from said medial position for moving said carriage lengthwise and for operating said line spacing mechanism.

3. In a printing machine having a platen, the combination comprising a device for injecting a sheet of record material past said platen, said sheet having a print line indicating means thereon, means for sensing the position of said print line indicating means at a predetermined location relative to said platen, means controlled by said last mentioned means upon sensing said indicating means to arrest said injecting device, a line spacing mechanism, a manually operable line spacing handle, means supporting said handle for movement in either of opposite directions from a medial position, means responsive to said handle upon movement thereof in one direction from said medial position to actuate said injecting device, and means responsive to said handle upon movement thereof in the opposite direction from said medial position to operate said line spacing mechanism.

4. In a printing machine having a frame, a carriage supported by said frame for lengthwise movement, and a platen carried by said carriage, the combination comprising a device for injecting a sheet of record material past said platen, said sheet having a print line indicating means thereon, means for sensing the position of said print line indicating means at a predetermined location relative to said platen, means controlled by said last mentioned means upon sensing said line indicating means to arrest said injecting device, a manually operable handle, means supporting said handle for movement in either of opposite directions from a medial position, means responsive to said handle upon movement thereof in one direction from said medial position to actuate said injecting device, and means responsive to said handle upon movement thereof in the opposite direction from said medial position to move said carriage lengthwise.

5. In a printing machine having a frame, a carriage supported by said frame for lengthwise movement, and a rotatable paper advancing platen carried by said carriage, the combination comprising an injecting device for injecting a sheet of record material past said platen, said sheet having a print line indicating means thereon, means for sensing the position of said print line indicating means at a predetermined location relative to said platen, means controlled by said last mentioned means upon sensing said line indicating means to arrest said injecting device, a line spacing mechanism for incrementally rotating said platen, a manually operable handle, means on said carriage supporting said handle for movement in either of opposite directions from a medial position, means responsive to said handle upon movement thereof in one direction from said medial position to actuate said injecting device, and means responsive to said handle upon movement thereof in the opposite direction from said medial position to move said carriage lengthwise and to operate said line spacing mechanism.

6. In a printing machine having a rotatable paper advancing platen, the combination comprising a feeding device for feeding a sheet of record material past said platen, said sheet having a print line locating hole therein, a feeler effective to enter said hole at a position adjacent said platen, means controlled by said feeler upon sensing said opening to arrest said feeding device, line spacing mechanism for incrementally rotating said platen, a manually operable handle, means supporting said handle for movement in either of opposite directions from a medial

position, yieldable means normally maintaining said handle in said medial position, means responsive to said handle upon movement thereof in one direction from said medial position to actuate said feeding device, and means responsive to said handle upon movement thereof in the opposite direction from said medial position to operate said line spacing mechanism.

7. In a printing machine having means for guiding a work sheet to a printing station, a punch adapted to punch a print line indicating hole in said sheet, means for operating said punch, means for feeding said work sheet through said guiding means, and means operable by said feeding means for causing said punch to sense said hole.

8. In a printing machine having means for guiding a work sheet to a printing station, the combination comprising a punch adapted to punch a print line indicating perforation in said sheet, means for operating said punch, means for feeding said work sheet through said guiding means, means operable by said feeding means for causing said punch to sense said perforation, and means controlled by said punch upon sensing said perforation for arresting said feeding means.

9. In a printing machine having means for guiding a work sheet to a printing station, the combination comprising a punch adapted to punch a print line indicating perforation in said sheet, means for operating said punch, means for feeding said work sheet through said guiding means, means operable by said feeding means for yieldably pressing said punch against the surface of said work sheet, and means responsive to entry of said punch into said perforation for arresting said feeding means.

10. In a machine of the class described having means for guiding a work sheet to a printing station, the combination comprising a punch adapted to punch a print line indicating perforation in said sheet, means for operating said punch, means for feeding said sheet through said guiding means, means operable by said feeding means for yieldably pressing said punch against the surface of said work sheet, a spring pressed device for arresting said feeding means, a latching device for normally latching said arresting device in ineffective condition, and means controlled by said punch upon entering said perforation for releasing said latching device.

11. In a printing machine having means for guiding a work sheet to a printing station, the combination comprising a punch adapted to punch a print line indicating perforation in said sheet, means for operating said punch to perforate said sheet, means for feeding said sheet through said guide means, a first spring normally maintaining said punch out of engagement with said sheet, and a second spring stronger than said first spring and operable by said feeding means for pressing said punch against the surface of said sheet whereby to sense said perforation.

12. In a printing machine having means for guiding a work sheet to a printing station, the combination comprising a punch adapted to punch a print line indicating perforation in said sheet, means for operating said punch to perforate said sheet, means for feeding said sheet through said guiding means, a first spring normally maintaining said punch out of engagement with said sheet, a second spring stronger than said first spring and operable by said feeding means for pressing said punch against the surface of said sheet whereby to sense said perforation, and means responsive to entry of said punch in said perforation for arresting said feeding means.

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