

March 15, 1938.

E. HOLZAPFEL

2,111,116

RECORD FEEDING DEVICE

Filed Sept. 22, 1936

3 Sheets-Sheet 1

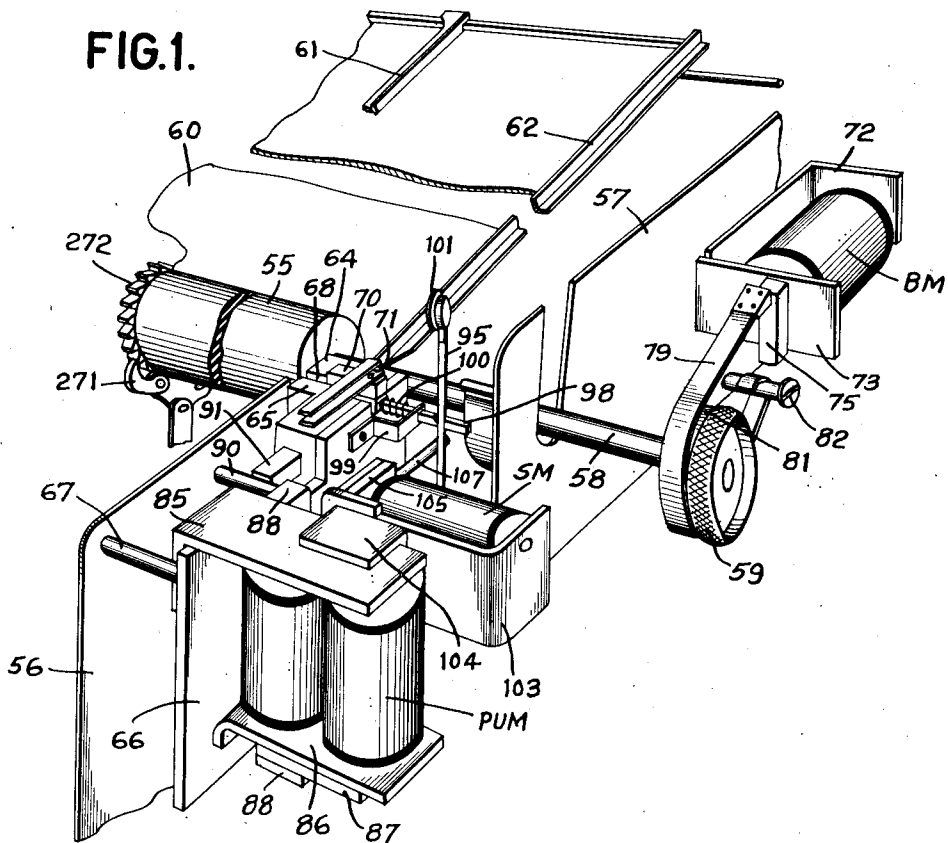
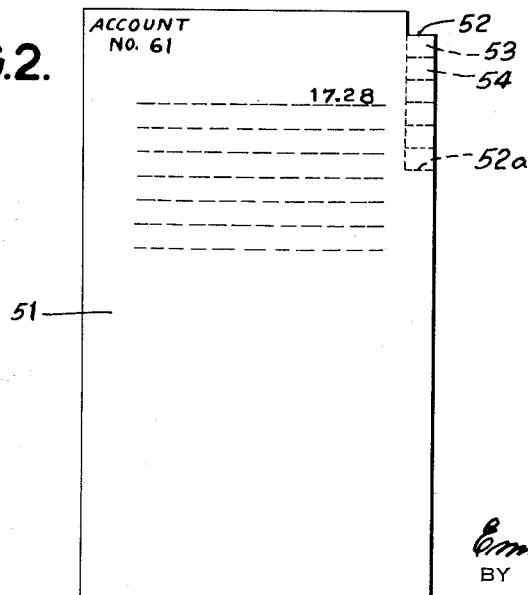


FIG. 2.



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3 Sheets-Sheet 3

FIG.5.

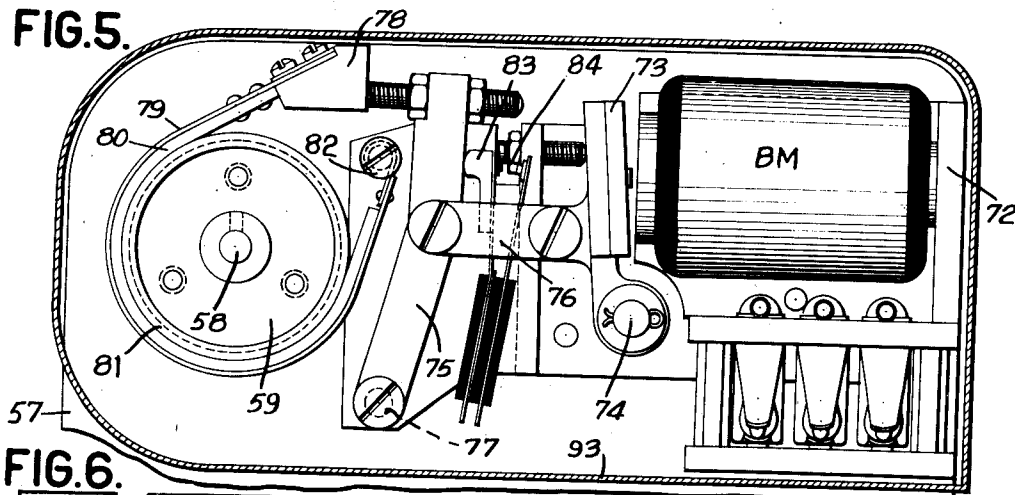
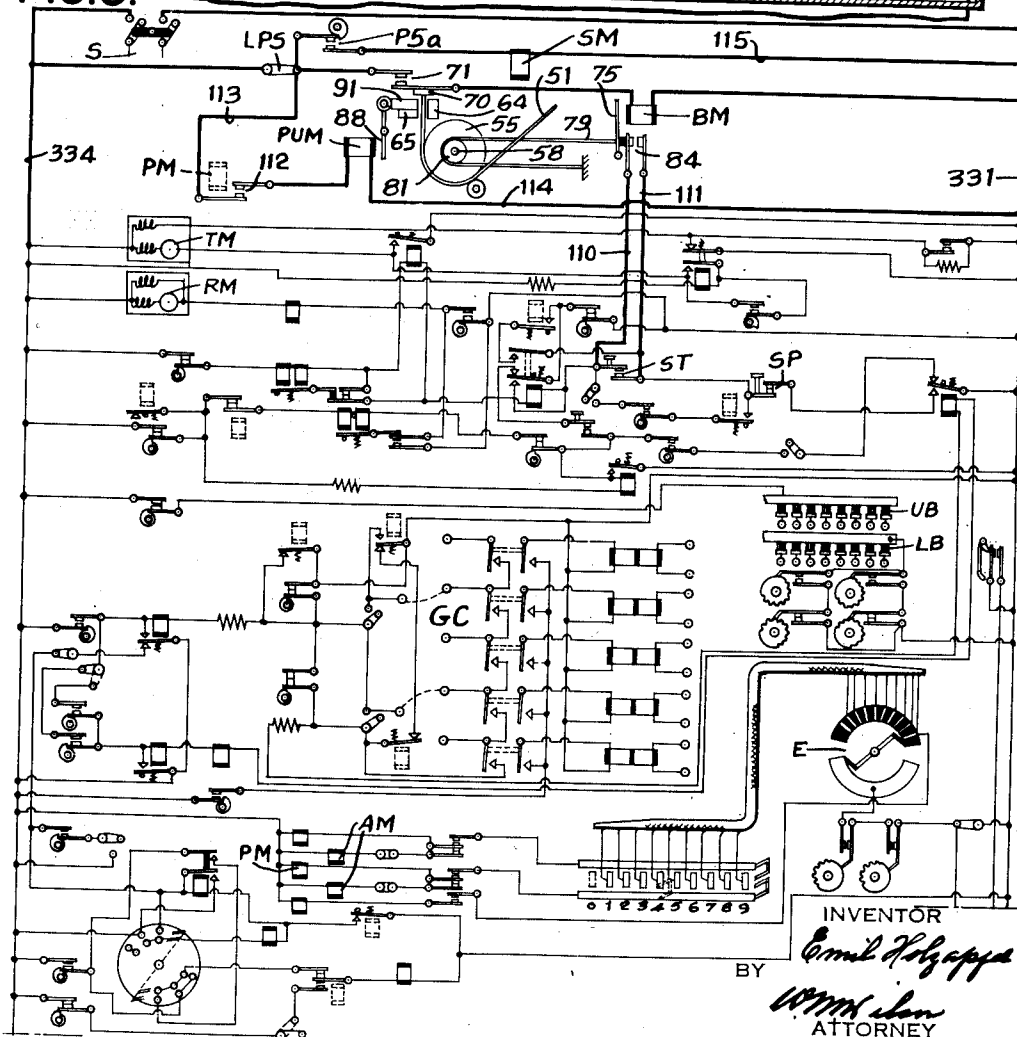


FIG. 6.



UNITED STATES PATENT OFFICE

2,111,116

RECORD FEEDING DEVICE

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13 Claims. (Cl. 197-127)

This invention relates generally to paper feeding devices and more particularly to the control of printing and feeding a ledger account sheet in an automatic record controlled tabulator.

5 An object of the invention is to provide an improved means for inserting a posted ledger sheet to the correct printing position. Such a sheet receives one or more lines of print and is removed from the machine; later, the sheet is reinserted and then it is necessary to place the sheet in position to receive a printing impression directly under the last previously printed line. These ledger sheets or account cards are usually inserted to the desired position by ordinary manipulation of a platen feed roller with consequent inaccuracy and waste of time. The usual inaccuracy of positioning is pronounced because these sheets are usually preprinted with regularly spaced lines for items. And the waste of time for account sheet placement is particularly disadvantageous in an otherwise automatic tabulating machine. The present invention provides means insuring accurate and speedy placement of the sheets.

25 An object of the invention is to provide means under control of the ledger sheet for stopping the sheet in a correct posting position. There is provided a sheet punching or notching device which operates automatically as line after line of print is impressed on the sheet, to cut a successively deeper marginal shoulder on the sheet. When the sheet is reinserted, this marginal shoulder effects locking of the platen when it is turned far enough to place the sheet in position to receive the next item of print. The platen is locked or stopped by a magnetic brake which is actuated under control of contacts closed by the differentially located shoulder cut in the sheet.

40 Another object of this invention is to provide means for automatically initiating printing as soon as the ledger sheet reaches the correct printing position. When the brake is applied to the platen, contacts are closed to automatically start the tabulator.

45 A further object of the invention is to provide means for automatically shifting the shoulder sensing devices away from the ledger sheet when the last item of the related account is printed thereon. This is done so that the sheet may be ejected from the machine. In a tabulating machine, perforated record cards of a related account are provided with similar group numbers which numbers are sensed and compared with numbers on successively fed cards so that a change in group numbers and accounts may be

detected. Such group control devices sense the appearance of the last item of a group and are connected to automatically shift the ledger posting devices out of the path of the ledger sheet so that it may be removed or automatically ejected. 5

The foregoing and other objects of the invention will become apparent as this specification continues with reference to the drawings which accompany it and form part of the disclosure.

In the drawings:

Fig. 1 is a perspective view of the ledger posting control devices cooperating with the right side of the platen. 10

Fig. 2 shows an example of the ledger sheet or account card which is spaced through and printed upon in the tabulator. 15

Fig. 3 is a side elevation view of the punching and sheet releasing devices.

Fig. 4 is a front elevation view of the devices shown in Fig. 3.

Fig. 5 is a side elevation view of the braking devices in the machine. 20

Fig. 6 shows a wiring diagram with the ledger posting controls connected to the tabulator control wires.

In Fig. 2 there is shown a ledger sheet 51 which shows a single line of print representing the amount \$17.28. It is noted that the upper right hand corner of the sheet is cut out with a shoulder 52. This is a shoulder which is a single step removed from the top of the sheet, indicating that only one printing operation has been performed on the sheet. As other printing impressions are made on the sheet, other squares 53, 54, etc. are cut out of the right margin to provide a differentially positioned shoulder to control the feeding of the sheet when it is reinserted. A square is cut out for each line of print so that after seven lines of print are impressed on the sheet, a shoulder is presented in the position 52a. 25

The record material may be in the form of a thin ledger sheet or a heavier account card.

Although the invention is illustrated as embodied in a record controlled tabulator of the type disclosed in United States Patent No. 1,976,617, it is understood that it may be applied as well to other forms of printing, sheet feeding, and accounting machines. In Fig. 6 is shown a wiring diagram of the controls in the printing tabulator of the patent. The perforated record cards are passed in succession under the upper and lower brushes UB, LB. There they are sensed and differentially timed impulses are sent through magnets such as magnet PM which stop type bars in position to print the data on the 55

ledger sheet. Successive cards pass under the upper brushes UB and lower brushes LB in synchronism so that the group numbers thereon may be compared by the group control devices GC. These devices serve to stop listing and accumulating operation when a group change is sensed, and also serve to initiate a total printing operation which is performed by the same print magnets PM now controlled by impulses from an emitter E, said impulses being timed by commutators set by the accumulating mechanism.

The tabulator may be set to print on the ledger sheet 51 under two kinds of control, listing or tabulating. When listing, the machine prints each item appearing on each of the record cards, and when a group change occurs, printing stops and the sheet may be removed with, or without, a total impression. Under tabulating control, items are not printed but merely accumulated, and then, when a group change occurs, a total is printed.

In Fig. 1 the platen feeding roller 55 is shown with the regular line spacing ratchet wheel 272 at the left end of the roller. Cooperating with the ratchet wheel is a pawl 271 which is moved back and forth by a linkage in the tabulator in a well known manner. When operating for listing, the pawl 271 operates the platen at each item entering cycle, and when operating for tabulating, the pawl moves only on total taking cycles.

For a more complete understanding of the ordinary operations of the tabulator outlined hereinbefore, reference may be made to Patent No. 1,976,617.

In Fig. 1 it is seen that the right end of the platen 55 is supported on frames 56 and 57 through which extends the platen shaft 58 terminating in the manipulative knob 59. Slanting to the rear of the platen is a paper table 60 upon which the ledger sheets 51 are placed between side guides 61 and 62, moved down and inserted between the feed rollers. Guide 62 is placed so that the right margin of the sheet 51 extends to the right of the platen 55 and is directed into a curved slot 63 (Figs. 3 and 4) between two blocks 64 and 65 secured to a plate 66 attached to frame 56 (Fig. 1) by studs 67. The blocks are cut with a T-slot 68 in which rides a vertically movable slide 69 which is attached to an insulation bar 70 underlying the lower blade of a pair of normally opened contacts 71. When the sheet 51 is inserted, shoulder 52 (Fig. 4) on the sheet approaches slide 69 as the sheet is fed with the previously printed area passing the printing position. When the last printed line is passed, shoulder 52 abuts under slide 69 and lifts it to close contacts 71. These contacts are connected to a braking magnet BM (Figs. 1 and 5) which, when energized, operates a brake on the platen shaft.

Magnet BM is mounted on a bracket 72 attached to the side frame 57. Cooperating with the magnet is an armature 73 pivoted at 74. The armature is connected by a link 76 to a brake lever 75 pivoted at 77. At the upper end of the lever is an adjustable screw block 78 fastened to one end of a flexible tape brake band 79 with an inner brake lining 80 wrapped around a brake drum 81 fastened to the platen shaft 58. The other end of the tape is fixed to a stationary screw stud 82 in the side frame.

The band 79 is usually loose around the drum 81 so that the operator may turn the knob 59 in a clockwise direction to feed the ledger sheet. However, as soon as the differentially cut posting

shoulder 52 (Fig. 4) strikes the slide 69 and closes the contacts 71, magnet BM (Fig. 5) is energized and acts to pull armature 73 in a clockwise direction and lever 75 along therewith to draw the brake band 79 tightly against the drum 81, stopping the platen movement so that the ledger sheet 51 is held in the correct posting position.

As lever 75 swings to the right (Fig. 5) to tighten the brake band, it pushes an insulation piece 83 carried on one blade of a pair of contacts 84, thus the contacts are closed. These contacts are connected to the starting circuit of the tabulator so that printing is started as soon as the ledger sheet is properly positioned. The control exercised by the contacts is explained more fully hereinafter with reference to the wiring diagram.

A cover 93 conceals the braking unit.

As each printing operation is initiated, a punch magnet PUM (Fig. 1) is energized to control the placement of a feed control indice on the sheet by clipping a square piece out of the margin of the ledger sheet. This magnet PUM is supported between a pair of brackets 85 and 86 attached to plate 66. Cooperating with magnet PUM is an armature piece 87 formed as an extension of a punch operating crank 88 loosely pivoted on a stud 89 on plate 66. The upper end of the crank carries a stud 90 which abuts against the end of a punch plunger 91 which is adapted to reciprocate in a square notch cut in the side of block 65. The end of the plunger is in line with a tapered die opening 92 cut in block 64. A spring (not shown) between plunger 91 and block 65, tends to keep the plunger retracted with its end out of the path of the sheet in slot 63. However, when magnet PUM is energized, crank 88 is rocked in a clockwise direction (Fig. 3) and stud 90 pushes plunger 91 to the left cutting the margin of the paper against the die opening 92 so that a square tab is removed, lowering the paper shoulder 52 one step. An adjustable stop screw 94 limits the restoring movement of the punch crank 88. Each step that the cut shoulder 52 is lowered is equal to the distance the sheet is spaced in a line spacing operation.

After a printing and punching operation, the sheet is spaced in readiness for another item recording and margin cutting operation. The differentially situated shoulder 52 thus formed on the ledger sheet is of value in controlling the distance that the sheet is fed when reinserted, as explained hereinbefore with reference to the braking devices.

Each line of print on the ledger sheet may be an item as controlled in listing, or it may be a total when the machine is operated under tabulating control.

When the printing of one or more lines of related data is finished, it is necessary to eject the ledger sheet so that another sheet may be inserted for operations in another account, but before this can be done the slide 69 normally overlying the shoulder 52 must be moved out of the path of the shoulder. Two means are provided for shifting or retracting the slide 69, one manual and the other automatic.

The manual shifting means comprises a shift lever 95 (Figs. 1, 3 and 4) pivoted on a screw 96 in a bracket 97 fastened to plate 66. Alongside the lever is a horizontal rod 98 extending from slide 69 through a bracket 99 on plate 66. The rod is notched to engage the lever so that the two are keyed together for movement. A com-

pression spring 100 presses between slide 69 and bracket 99 and tends to hold the slide, rod and lever to the right (Fig. 4) with the slide in sheet stopping position. However, when the operator presses against a button 101 at the top of lever 95, the lever is rocked counterclockwise, rod 98 is shifted to the left, and slide 69 moves along therewith, out of the path of sheet 51 so that it may be fed out or automatically ejected.

The opening in bracket 99 through which rod 98 passes is large enough to permit the rocking of the rod as the slide rises to close contacts 71.

A stop screw 102 on bracket 97 cooperates with a shoulder on shift lever 95 to limit the extent of operation of this member.

The automatic shifting means comprises a shift magnet SM which is adapted to rock lever 95. The magnet is mounted on a bracket 103 attached to an angle iron 104 secured to bracket 85. Cooperating with the magnet SM is an armature lever 105 pivoted on a stud 106 extending from the angle iron 104. Projecting from the side of armature 105 is a pin 107 which is long enough to pass the side of lever 95. When shift magnet SM is energized, armature 105 is rocked in a counterclockwise direction (Fig. 4) and pin 107 thereon pushes shift lever 95 in the same direction to operate it just as though button 101 had been pressed. The result is that slide 69 is moved out of the path of the ledger sheet 51 so that it may be fed or ejected.

The magnet SM is energized under control of the tabulator every time a total print and reset cycle is initiated by the group control devices.

At the top of the wiring diagram in Fig. 6 the electrical ledger sheet feed controls are shown connected to the tabulator wiring. The closure of a posting switch LPS connects the feed controls to one of the tabulator main lines 334. Then, when the shoulder on the sheet 51 lifts block 70 to close contacts 71, a circuit is closed through the braking magnet BM. The circuit includes line 334, switch LPS, contacts 71, magnet BM and line 331. Energized magnet BM then moves lever 75 to tighten the brake band 79 and at the same time it closes the start contacts 84. These contacts form part of a shunt connection including wire 110, the contacts 84 and a wire 111 connected around the regular start key contacts ST. There results an energization of the tabulator driving motor TM just as though the start key had been depressed. The record cards are fed and printing is controlled thereby.

Every time a printing operation is effected, a print magnet PM closes a pair of contacts 112 to energize the punch control magnet PUM. The magnet PM may be the units order magnet which is energized on every print cycle. The punch control circuit includes line 334, switch LPS, wire 113, contacts 112, magnet PUM, wire 114 and line 331. Magnet PUM then operates punch 91 to clip a square out of the margin of sheet 51.

Whenever the group control devices GC sense a change in group or account numbers on the record cards, they operate to stop the tabulating motor TM, thus stopping card feeding, and at the same time initiate operation of the reset motor RM for a total printing and reset operation. During the second half of the reset cycle a total and reset cam closes a pair of contacts P5a to initiate operation of the shift magnet SM so that the marginal sensing slide 69 is moved out of the path of the ledger sheet. The shift circuit includes line 334, switch LPS, contacts P5a, magnet SM and wire 115 to line 331. When the slide

is moved clear of the sheet it may then be fed or automatically ejected.

While there is disclosed the fundamental novel features of the invention as applied to a printing machine, it will be understood that various omissions, substitutions and changes in the forms and details of the devices illustrated and in their operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention therefore to be limited only as indicated by the scope of the following claims.

What is claimed is as follows:

1. In a machine for feeding record sheets, a platen carrying said sheet, a brake drum attached to said platen, a friction brake mechanism cooperating with the brake drum to stop the sheet at a differential position, and means under control of the sheet for operating the brake mechanism to clamp the drum and stop the platen and sheet in print receiving position.

2. In a machine for feeding record sheets, a platen for holding and feeding said sheet, means for placing feed control indicia on said sheet, a brake mechanism cooperating with the platen to stop the sheet in a predetermined position, electrical means for sensing said indicia, and an electro-magnet under control of said sensing means for operating the brake mechanism.

3. In a machine for printing a record sheet, a feed roller carrying said sheet, means connected to said roller to turn it to feed the sheet, a brake drum connected to said roller, a brake band wound around said drum and fastened at one end, an armature lever attached to the free end of said band, a magnet for attracting said lever to tighten the band, and an electric circuit for said magnet including contacts that are closed by the sheet to operate the brake when the sheet is in a predetermined position.

4. In a machine for printing a ledger sheet, means for printing lines of data on the sheet, means for line spacing the sheet between printing operations, a punch for clipping a square portion off the margin of said sheet to lower a marginal shoulder thereon as printing progresses, means for operating said punch on every printing operation, means for inserting the sheet, a brake mechanism connected to said inserting means, a magnet for operating said mechanism, and an electric circuit for said magnet including contacts which are operated by said shoulder to energize the brake magnet when the sheet has been inserted far enough so that printing operations may be continued.

5. In a machine for printing a ledger sheet, printing devices, means for line spacing said sheet as printing progresses, means for cutting out a portion of the margin of said sheet on every printing operation to form a progressively lowered shoulder on the sheet, means for re-inserting said sheet, means cooperating with said shoulder on the sheet for limiting the extent of operation of said re-inserting means, and means under control of said printing devices for automatically shifting said limiting means out of the path of said shoulder so the sheet may be ejected from the machine.

6. In a machine for printing a ledger sheet, printing devices, means for line spacing said sheet as printing progresses, means for cutting out a portion of the margin of said sheet on every printing operation to form a progressively lowered shoulder on the sheet, means for re-inserting said sheet, means cooperating with said shoulder on

the sheet for limiting the extent of operation of said re-inserting means, manipulative means for shifting said limiting means out of cooperation with said shoulder so that said sheet may be fed out of the machine, and means under control of said printing devices for automatically operating said shifting means.

7. In a machine controlled by groups of record cards for printing lines of data on ledger sheets, means for printing an item under control of each card, means for line spacing the ledger sheet between printing operations, means for punching a square section out of the margin of the sheet for each line space to form a shoulder located differentially on the sheet according to the number of printing operations thereon, means for inserting said sheet, means operated by said shoulder on said sheet when inserting it for limiting the movement of the inserting means to place the sheet in position to receive a printing impression directly under the last printing impression, means for sensing a change in group of the record cards, and means under control of said sensing means for shifting the means operated by the shoulder out of the path of the shoulder so that said sheet may be ejected.

8. In a machine for producing record sheets, means for printing on said sheet, a platen carrying said sheet, means for operating the platen to feed the sheet, a brake mechanism cooperating with the platen to stop the sheet in a differential position, means for operating the mechanism and means controlled by the mechanism to initiate operation of said printing means when the brake mechanism is operated to stop the sheet.

9. In a machine for feeding record sheets, a platen for holding and feeding said sheet, means for placing feed control indicia on said sheet, a brake mechanism cooperating with the platen to stop the sheet in a predetermined position, means under control of the indicia on the sheet for operating the brake mechanism, means for printing on said sheet, and means under control of said mechanism for initiating operation of said printing means.

10. In a record controlled tabulator for print-

ing a ledger sheet, a platen carrying said sheet, means for operating the platen to insert a sheet, means for punching feed control indicia in said sheet as printing progresses, a brake mechanism cooperating with the platen to stop it when the sheet is in a correct posting position, means under control of said indicia for operating said mechanism, contacts closed by said brake mechanism when it is operated, and electrical start circuit including said contacts for initiating operation of said tabulator when the sheet is stopped by the brake mechanism.

11. In a machine for producing a ledger sheet, means for printing lines of data on said sheet, means for line spacing said sheet as printing progresses, means for punching out a portion of the margin of said sheet on each printing operation to form a progressively lowered shoulder on the sheet, means for inserting the sheet, means cooperating with said shoulder for stopping said inserting means, and means under control of said stopping means for initiating operation of said printing means.

12. In a machine for producing a ledger sheet, means for printing lines of data on said sheet, means for line spacing said sheet as printing progresses, means for punching out a portion of the margin of said sheet on each printing operation to form a progressively lowered shoulder on the sheet, means for inserting the sheet, means cooperating with said shoulder for stopping said inserting means, means under control of said stopping means for initiating operation of said printing means, and means under control of said printing means for automatically shifting said stopping means away from said shoulder so that said sheet may be ejected.

13. A machine as set forth in claim 5 wherein the printing devices are adapted to print items and totals and the means for shifting the limiting means is operated on total printing cycles by said printing devices to shift said limiting means out of the path of the shoulder on the sheet so that said sheet may be ejected from the machine after the total is printed.

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