March 5, 1940. R. L. MULLER 2,192,324

PAPER EQUIPMENT FOR CALCULATING MACHINES

Filed Oct. 30, 1937 3 Sheets-Sheet 1

Fig. 1.

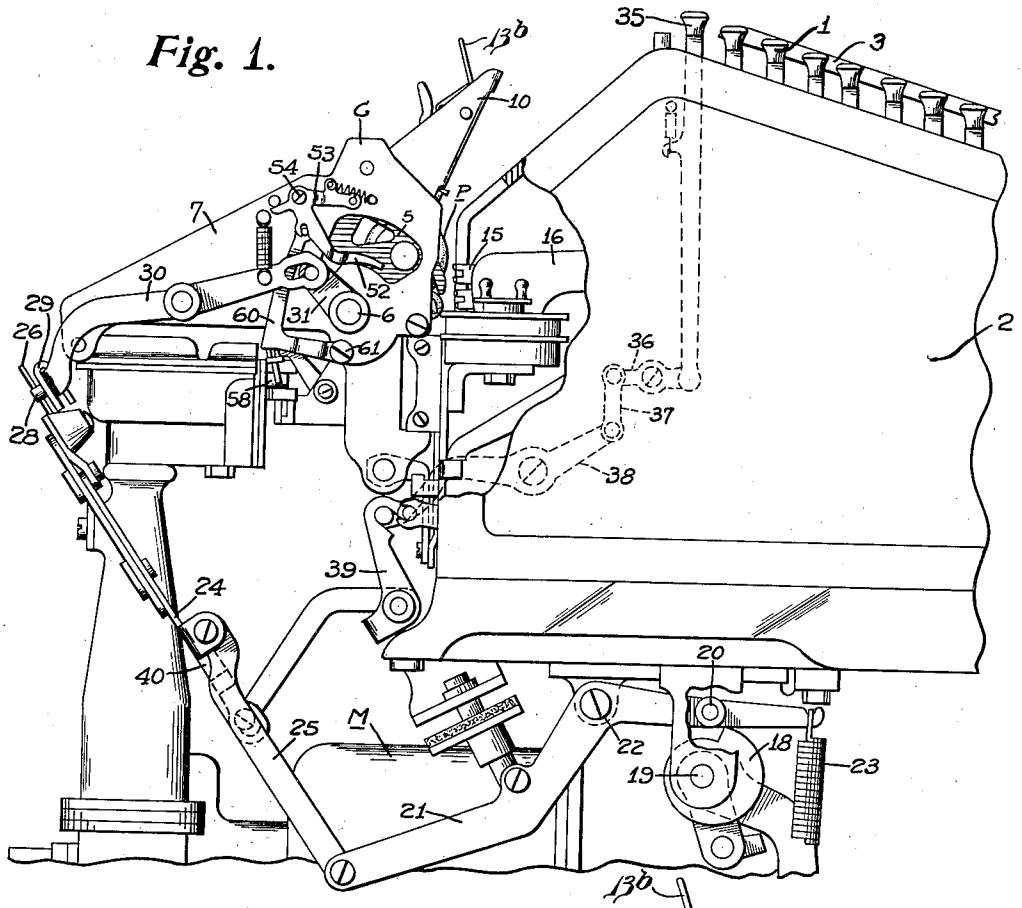
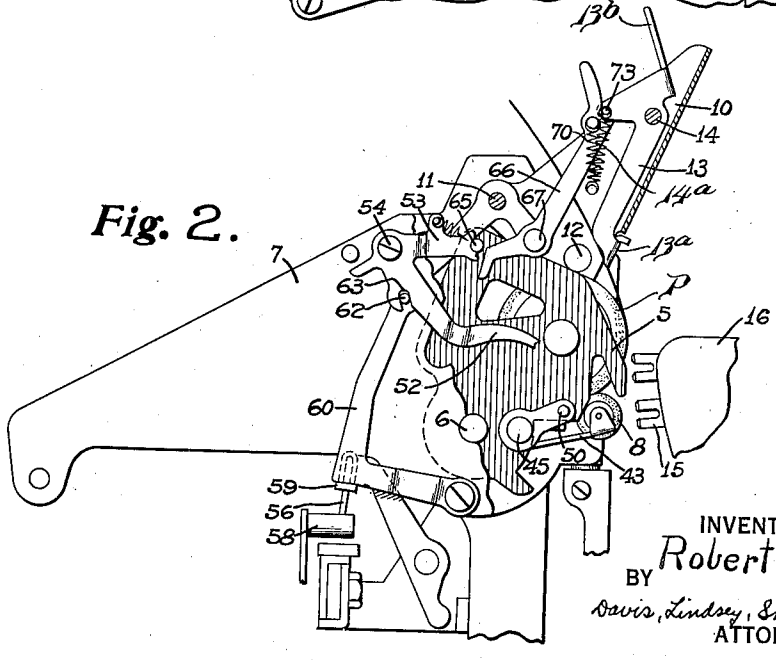


Fig. 2.



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Filed Oct. 30, 1937 3 Sheets-Sheet 2

Fig. 3.

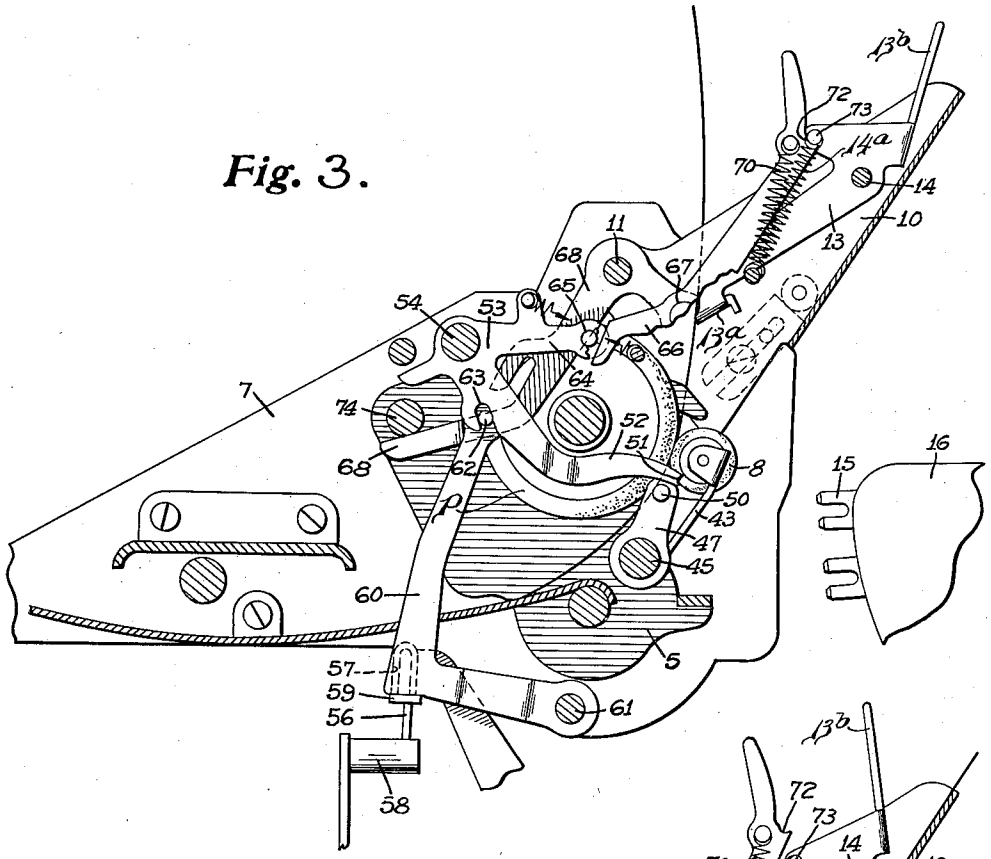
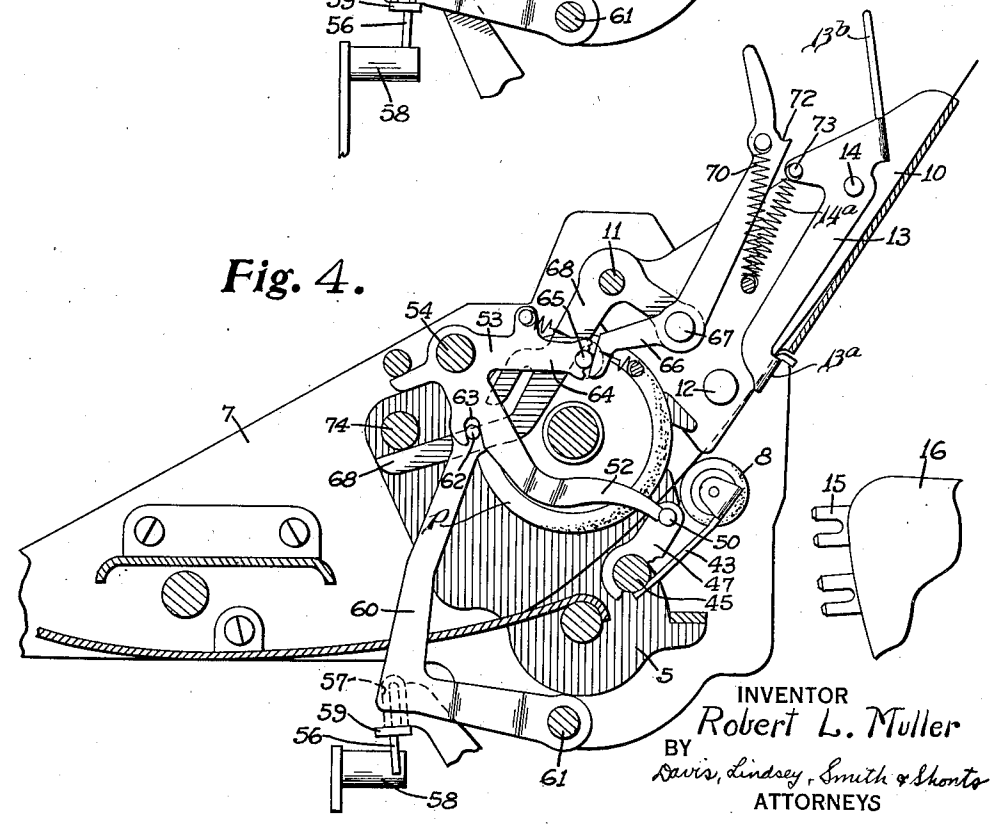


Fig. 4.



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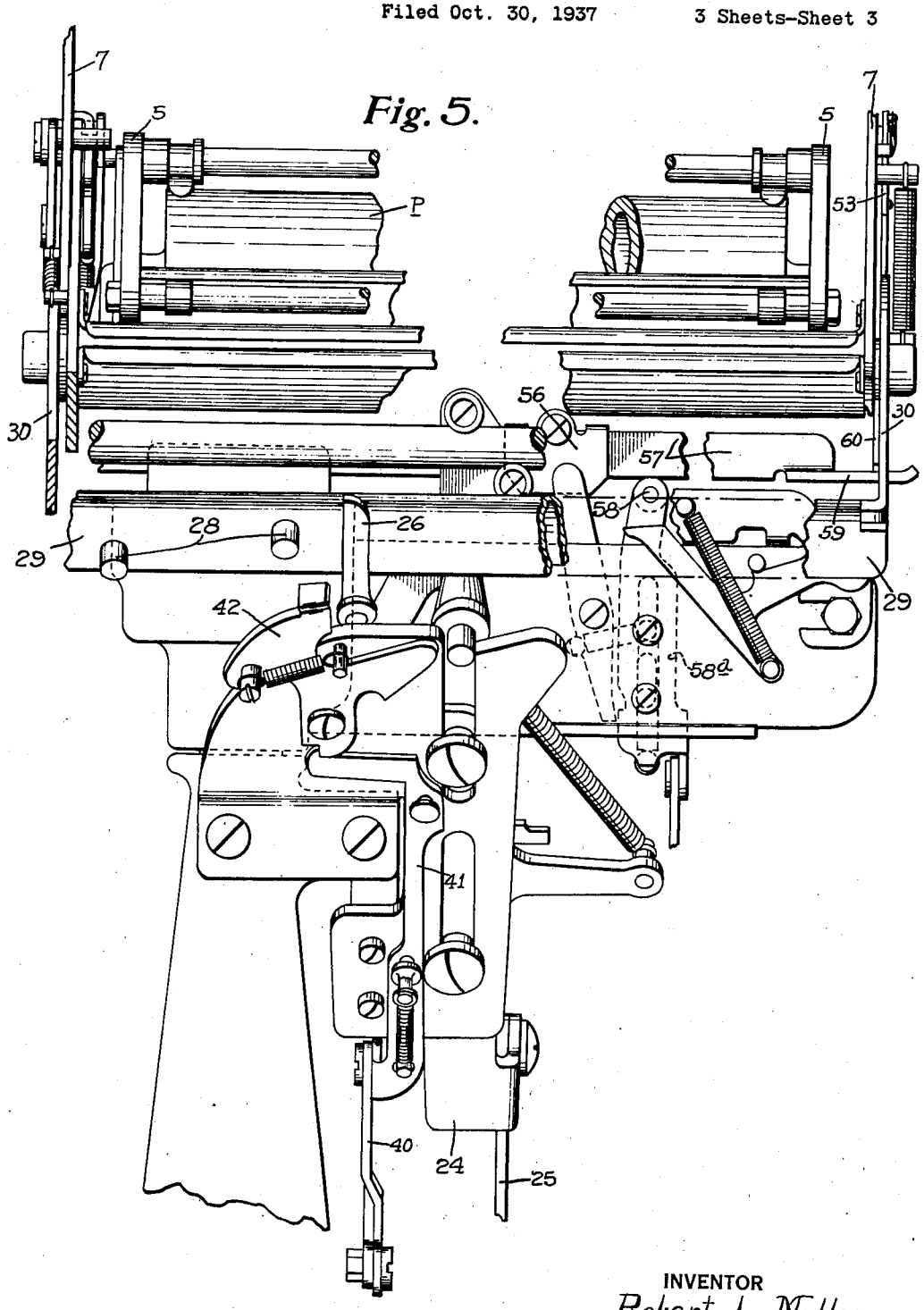
Filed Oct. 30, 1937 3 Sheets-Sheet 3

Fig. 5.



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Patented Mar. 5, 1940 2,192,324

UNITED STATES PATENT OFFICE

2,192,324

PAPER EQUIPMENT FOR CALCULATING MACHINES

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Application October 30, 1937, Serial No. 171,879

7 Claims. (Cl. 197—127)

This invention relates to a calculating machine. It concerns that portion of the machine which receives and holds the record material upon which printing impressions are made and it relates particularly to what is called a "line finder."

The object of the invention is broadly, to provide an improved construction for facilitating the handling of record material in a calculating machine.

A more particular object is to provide an improved construction and arrangement for enabling the operator to quickly adjust the record material to the proper line space position, and to enable him to readily read the entries.

A further object is to improve the operation and control of the mechanism of a device of the character mentioned.

Other and further objects and advantages of the invention will be apparent hereinafter.

In the drawings:

Figure 1 is a left side elevational view of the machine and carriage;

Fig. 2 is a left side elevational view of a portion of the carriage and reading mechanism associated therewith, and illustrating the platen in printing position;

Fig. 3 is a view similar to that of Fig. 2 but illustrating the platen in throwback position for reading, the feed rolls in engagement with the platen, and the line finder in active line reading position;

Fig. 4 is a view similar to Fig. 3 but illustrating the platen in throwback position, the front-feed throat being open and the line finder being in inactive position; and

Fig. 5 is a rear elevation of certain portions of the platen and throwback mechanisms.

The invention is shown applied to a calculating machine of the type known as the Burroughs high keyboard. This machine will be described only very briefly as its construction is well known in the art because of the long period during which said machine has been on the market and also because of the numerous patents that have issued disclosing the various features of it. The present application is a continuation in part of my copending application Serial No. 82,731, filed June 1, 1936, now Patent No. 2,147,051.

General Construction

The machine has the usual amount keys 1 shown in Fig. 1 which may be depressed to enter items in the machine. These items may be added or subtracted, depending on how the machine is conditioned, and totals or subtotals thereof may be taken as required. The various mechanisms for accomplishing these results are inside the casing 2, but they have not been illustrated, as such illustration is not necessary for an understanding of the present improvement.

The machine is driven by a motor M which gives the machine a cycle of operation upon depression of a motor bar 3, also illustrated in Fig. 1.

The record material 4 upon which printing impressions are made is carried by a rotatable platen P. This record material ordinarily comprises a relatively long paper sheet called a record sheet (not shown) that is adapted to receive a long series of entries, and individual paper sheets called work sheets that are inserted and removed from time to time, each of the latter sheets ordinarily receiving only a few entries. Normally, at a predetermined time during a cycle of operation of the machine, a printing mechanism of which parts 15 and 16 are shown in Fig. 1, is operated to make impressions on the record material in the machine.

Provision is made for printing in different columns on the paper, and the columns are usually selected automatically. For this purpose, a columnar-printing control means is provided. In the embodiment shown a traveling paper carriage C supports the platen P which carriage is normally tabulated from one column to another as an incident to each machine cycle, an automatic carriage return mechanism also being provided. The tabulating and the return mechanisms are described in detail in Rinsche Patent 1,580,534.

Provision is also made for enabling the work sheets to be front fed with respect to the platen and, since the present invention is associated more particularly with this part of the machine, the front-feed construction will be briefly described.

Front-feed

The purpose of the front-feed is to make it easy for the operator to remove one work sheet and insert another in front of the platen while the record sheet remains about said platen. After a predetermined operation of the machine, the mechanism that holds the work sheet is operated so as to release said sheet to enable the operator to remove it, this operation being referred to as the opening of the front-feed throat. Guiding devices are provided to enable a new sheet to be inserted quickly after which the sheet is again gripped by closing the front-feed throat.

The platen P is mounted in a platen frame 5 that is pivotally carried by a shaft 6 supported by

the paper carriage frame 7, the mounting being such as to enable the platen to be moved from a printing position relative to the printing mechanism to a throwback or front-feed position and vice versa. The mechanism for throwing back the platen is ordinarily operated by power and it is automatically controlled as will be later explained. Pressure or feed rolls 8 are provided which are urged to a position such that they tend to engage the platen to hold the record material against said platen in feeding relation thereto. As the platen is moved from printing to throwback position, these pressure rolls are normally separated from the platen to open the throat and release the work sheet.

A front-feed table 10 is also utilized for facilitating the front feeding of work sheets and for supporting these sheets during front-feed insertion into the machine. This table is pivoted to the carriage frame 7 at 11 and carries a stud 12 which engages the upper edge of the platen frame 5, which edge is so formed as to cause the table to rock forwardly to sheet-receiving position as the platen is moved to throwback position and to be rocked rearwardly to a more vertical or sheet-holding position as the platen is returned to printing position. When in its sheet-receiving position, the table assists in directing and supporting front-fed sheets beneath the platen.

Opening and closing of the front-feed throat and movement of the platen from printing to throwback position for both paper inserting and reading operations and vice versa are accomplished and controlled automatically, as is more fully disclosed in the Burroughs British Patent No. 382,613 of July 23, 1930. Briefly, this mechanism is as follows:

As the machine is given a cycle of operation a cam 18 on the motor operated shaft 19 is rotated clockwise into engagement with a stud 20 carried by a lever 21 that is pivoted at 22 to the machine, thereby rocking the lever 21 counterclockwise and tensioning a spring 23 which urges the lever 21 in a clockwise direction. As the lever 21 is rocked counterclockwise, a slide 24 having connected thereto a link 25 is drawn downwardly where it is held by a latch 26 adapted to be engaged and released by studs 28 carried by a bail 29 at predetermined carriage positions. Upon its release, slide 24 is moved upwardly by the spring 23 and raises the bail 29 which, in turn, rocks a pair of levers 30 supporting the bail 29. The forward ends of levers 30 are connected to arms 31 fixed to shaft 6, which is rocked counterclockwise by levers 30, thereby rocking the platen frame 5 and raising the platen P to throwback position and lowering table 10 to sheet-receiving position. The platen and associated members are returned to printing position by gravity aided by springs upon lowering of bail 29. The foregoing mechanism provides for automatic carriage control and power operation of platen movement and throat opening.

Movement of the platen and opening and closing of the front-feed throat may also be key controlled. For this purpose a key 35 is utilized which, upon depression, rocks a lever 36 connected by a link 37 to a lever 38. Movement of lever 38 rocks a bail 39, one arm of which is connected to a link 40 which in turn lowers a slide 41 which releases a spring-fired hammer 42 for engaging and releasing latch 26. This mechanism is similar to that shown in said British Patent No. 382,613.

When the machine is in open throat condition, i. e., when the platen 10 is in raised or throwback position for the purpose of inserting new sheets, the feed rolls 8 should be disengaged from the platen in order that the work sheets may be freely withdrawn or inserted into the machine and adjusted. A mechanism for causing such disengagement between the feed rolls and the platen has been provided for and described in the aforesaid British patent, and a similar mechanism is embodied in the present invention although differing somewhat in its construction and operation as will now be described.

Line finder

A line finder 13 (Figs. 3 and 4) is provided in the form of two side arms joined by a bail 13a that extends for substantially the full width of the carriage. This line finder is pivoted at 14 to the paper table 10 and it is urged counterclockwise to inactive position by a spring 14a. When in inactive position the line finder bail forms a portion or extension of the paper table 10. In fact, said line finder forms the lower edge of the table and it acts, when the table is in sheet-holding position, to engage the upper end of the work sheet to assist in holding said sheet about the platen, as shown in Fig. 2.

When the platen is thrown back with the front-feed throat open, the line finder normally occupies the position illustrated in Fig. 4. In this position it not only does not interfere with the insertion of a new sheet but it assists in guiding a new sheet to position. After the operator has inserted a new sheet, he can swing the line finder clockwise from its Fig. 4 position by means of the thumb piece 13b. This swings the line finder bail to a position such that it defines the last entry and enables the operator to adjust the sheet in the front-feed throat to proper line space position. The line finder can be held in line finding position by hand, or a latch can be provided for holding it as described in said copending application Serial No. 82,731, now Patent No. 2,147,051. After the sheet has been adjusted the operator releases the line finder whereupon it moves back to inactive position under the urge of its spring 14a. When, subsequently, the platen is returned to printing position and the paper table 10 is swung to sheet-holding position, the line finder is out of the way. It not only does not interfere with the movement of the paper table, but it is positioned so that it acts as a part of the paper table and assists in holding the work sheet about the platen.

When the platen is in printing position the last entries are not visible but, occasionally, it may be necessary or desirable to read such an entry. And it is desirable to be able to do this without opening the front-feed throat as such opening releases the work sheet which might then get out of position. Provision is made for throwing the platen back without opening the throat which is usually called a "reading" operation. The throwback position of the platen is the same as its front-feed position, the difference being that in one case the throat is open and in the other, it is closed. The operator causes this throwback of the platen at will by depressing the key 35 (Fig. 1), but it may also occur automatically under the control of the carriage, as described in said British patent.

The present invention provides for automatically moving the line finder to line finding position when the platen is moved back for the purpose of reading the entry. This makes it

unnecessary for the operator to move the line finder manually and it accomplishes two things, namely, the line finder moves the upper end of the work sheet to a substantially vertical position so that the entry may be easily read and said line finder also defines the entry to make it easy for the operator to read it. The mechanism for obtaining this automatic operation will now be described.

The pressure rolls 8 are carried below and forwardly of the platen feed by arms 43 fixed to a shaft 45 mounted in the platen frame 5. Fixed to the shaft 45 is an arm 47 which moves with the shaft and thus moves with the pressure rolls 8. The control of the feed roll and the arm 47 is governed by a stud 50 on the end of the arm 47 which, under certain conditions, engages a notch 51 in the end of a forwardly and downwardly extending arm 52 of a three-armed lever 53 pivoted at 54 to the carriage frame 7.

As shown in Fig. 4, when the platen P and its frame 5 are rocked from printing position (Fig. 2) to the raised or throwback position (Fig. 4) for the purpose of withdrawing or inserting and aligning a work sheet to the correct printing line, the pressure rolls 8 follow the platen in engagement therewith until the stud 50 engages the notched end 51 of the arm 52 (Fig. 4) at which point further movement of the rolls 8 is halted while the platen P completes its movement to throwback position.

When the platen is thrown back and the front-feed throat opened as just described, the line finder is not disturbed but remains in the position shown in Fig. 4. Thereafter, the operator may manually rock the line finder to line finding position and raise the sheet to a readable position with the line finder defining the line to which the sheet is to be adjusted.

When the platen is thrown back for the purpose of reading an entry it is not desired that the front-feed throat be opened and hence provision is made for allowing the feed rolls to remain in engagement with the work sheet. In the embodiment disclosed the platen is thrown back for reading purposes automatically and selectively under the control of the carriage.

For this purpose an adjustable skid 56 is carried by the skip tabulating bail 57 supported by the carriage and adapted to engage a roll 58 carried by a member 58a. The parts 56, 57, 58 and 58a are used for skip tabulating the carriage as shown and described in the Rinsche Patent No. 1,580,534. The skid 56 is positioned to engage the roll 58 in those columns in which reading is to occur. When the skid 56 engages the roll 58, in the column in which reading is to occur and where the platen is automatically moved to throwback position, the skid 56 is forced upwardly in a clockwise direction causing an extension 59 on the left end of the skid to engage and rock clockwise an L-shaped lever 60 pivoted at 61 to the carriage frame 7. The upwardly extending arm of the lever 60 has a stud 62 engageable in a slot 63 in the arm 52 of the three-armed lever 53 to raise or rock arm 52 from its normal position counterclockwise when the carriage reaches the reading column. Thus, when the platen P is moved from printing to throwback position for a reading operation in this predetermined column, the arm 52 is moved out of its normal stud-engaging position as shown in Fig. 3 so that the stud 50 of the arm 47 associated with the feed rolls 8 will not engage the notch 51. As a consequence, the feed or pressure rolls 8 are permitted to remain in engagement with the platen P throughout its entire movement to throwback position and while it remains therein, and cause the sheets about the platen to be held in position without any possibility of slippage.

When the platen is thrown back for reading an entry the line finder 13 is automatically moved to active line finding position and in so moving it acts to raise the upper end of the work sheet to a substantially vertical position so that the line that is defined may be easily read by the operator. This is accomplished by the following means.

The three-armed lever 53 is formed with an upper forwardly extending arm 64 which carries a stud 65 at its forward end in position to engage the end of a lever 66 pivoted at 67 to the forward arm of a lever 68 pivoted at 11 to the carriage frame 7 and urged in a clockwise direction by a spring 70. Normally lever 66 is retained in its counterclockwise position by stud 65 but when lever 60 is raised by skid 56 lever 53 is rocked counterclockwise to remove stud 65 from the lower end of lever 66 to permit lever 66 to rock clockwise for reasons which will later appear. Lever 66 is formed with a notch 72 in its upper end portion which is adapted to engage a stud 73 carried by an extension of the upper portion of the line finder 13 when the lever 66 is in its clockwise position as shown in Fig. 3.

As the platen frame 5 nears the end of its throwback movement a stud 74 carried by the platen frame 5 engages the lower rear end of lever 68 and rocks the latter counterclockwise which, in turn, causes lever 66 to be moved upwardly. As a result of this upward movement of lever 66, the stud 73 is moved and it rocks the line finder 13 clockwise. Accordingly, as movement of the platen frame 5 to full throwback position is completed the line finder 13 is rocked clockwise so as to engage and raise the sheet into an upright visible position and to indicate the last line of printing as shown in Fig. 3.

Thus, when the carriage reaches a position where it is desirable that the operator read the entry, said operator need do nothing. The platen is thrown back automatically to throwback position, the line finder is moved automatically to a line-finding position, the upper end of the sheet is moved to an easily readable position, and the line to be read is defined by the line finder.

When the operator again returns the platen to printing position, the parts move to the position of Fig. 2. As the platen moves from the Fig. 3 position toward printing position, the stud 74 releases lever 68 which is thereupon moved clockwise by its spring 70. This tends to move the shoulder 72 away from the stud 73 but the stud follows the shoulder for a distance because the line finder is rocked counterclockwise by its spring that acts to return the line finder toward inactive position. This movement continues until the line finder reaches its normal inactive position whereupon said line finder stops but the lever 68 is rocked slightly farther so as to separate the shoulder 72 from the stud 73 as shown in Fig. 2. Whether or not the shoulder 72 engages the stud 73 the next time the platen is raised depends upon the control of lever 66. If the platen is to be thrown back to a reading position, the shoulder again acts to move the line finder. But, if the platen is thrown back with the front-feed throat opening, the lever 66 is moved so that the shoulder 72 does not engage stud 73 and the line finder is not moved to line-finding position.

Thus, it will be seen that a construction has been provided in which, when the platen is thrown back to a reading position with the front-feed throat closed, and when the paper table is moved to a sheet-receiving position, the line finder is automatically moved to a line-finding position where it not only defines the line to be read but holds the upper end of the work sheet in a readable position. When the platen is returned to printing position, the line finder is returned to inactive position and the paper table, together with the line finder, is moved to a sheet-holding position to hold the paper about the platen for printing purposes as shown in Fig. 2.

Although the foregoing description has set forth one form of this invention as applied to a "Burroughs" high keyboard bookkeeping machine, it will be apparent that the invention may embody other specific forms and may be applied to different types of business machines. It will also be understood that changes and modifications may be resorted to without departing from the spirit and scope of the invention as defined in the appended claims.

This patent discloses a species of a broader invention disclosed and claimed in my copending application Serial No. 254,790, filed February 6, 1939, where the selective control and automatic operation of a device for holding a sheet about a platen when the platen is moved to a reading position is claimed without regard to whether or not it is a line finder and without including the details of the present patent.

I claim:

1. In a front-feed machine of the class described having a printing mechanism, a platen movable from a printing position relative to said printing mechanism to a throwback position and vice versa, front-feed means for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means having portions movable from a closed to an open-throat condition and vice versa; a line finder movable from an inactive to an active line finding position relative to said platen, selectively controllable line-finder moving means operating automatically during selected movements of said platen to throwback position to move said line finder to line finding position, means for selectively controlling said line finder moving means, said line finder moving means having portions acting to hold said line finder in said line-finding position and said line finder having portions acting to hold the upper end of an inserted work sheet in substantially vertical position to enable the entries to be easily read, and restoring means for returning said line finder to inactive position, said line finder moving means and line finder being constructed and arranged so that as said platen is returned to printing position said line finder will be released to enable said restoring means to automatically move said line finder to an inactive position for line finding.

2. A front-feed machine of the class described having a printing mechanism, a platen movable from a printing position relative to said printing mechanism to a throwback position and vice versa, means for moving said platen from one position to the other, a front-feed paper chute movable from a sheet-receiving to a sheet-holding position and vice versa, a line finder movable independently of said paper chute from an inactive position to an active line finding position relative to said platen and vice versa, line finder moving means acting automatically during selected movements of said platen from printing to throwback position for moving said line finder to line finding position, said line finder having portions acting to hold the upper end of a work sheet in substantially vertical position, and means automatically operating, as said platen is returned to printing position, to move said line finder to a position to assist in holding the work sheet about said platen.

3. A front-feed machine of the class described having a printing mechanism, a platen movable from a printing position relative to said printing mechanism to a throwback position and vice versa, means for moving said platen from one position to the other, a front-feed paper chute movable from a sheet-receiving to a sheet-holding position and vice versa, a line finder movable from an inactive position to an active line finding position relative to said platen and vice versa, line-finder moving means acting automatically during selected movements of said platen from printing to throwback position for moving said line finder to line finding position, said line finder moving means also acting to hold said line finder in line finding position, said line finder and its moving means being constructed and arranged so that, as said platen is returned to printing position, said line finder will be disengaged from said moving means, and means automatically operating as said platen is returned to printing position to move said line finder to a position to assist in holding the work sheet about said platen.

4. A front-feed machine of the class described having a printing mechanism, a platen movable from a printing position relative to said printing mechanism to a throw-back position and vice versa, means for moving said platen from one position to the other, a front-feed paper chute movable from a sheet-receiving position to a sheet-holding position and vice versa, a line finder movable independently of said paper chute from an inactive position to an active line finding position relative to said platen and vice versa, line-finder moving means acting automatically during selected movements of said platen to throwback position for moving said line finder to line finding position, and means automatically operating, as said platen is returned to printing position, to move said line finder rearward to a position to assist in holding the work sheet about said platen.

5. A front-feed machine of the class described having a printing mechanism, a platen movable from a printing position relative to said printing mechanism to a throwback position and vice versa, means for moving said platen from one position to the other, a front-feed paper chute movable from a sheet-receiving to a sheet-holding position and vice versa, a line finder having a line-finding blade of a length substantially equal to that of said platen, said line finder blade being movable independently of said paper chute from an inactive to an active line finding position relative to said platen and vice versa, selectively controllable line-finder moving means operating automatically during selected movements of said platen to throwback position for moving said line finder blade to line finding position adjacent said platen, and means automatically operating as said platen is returned to printing position to move said line finder blade to a position to assist in holding the inserted work sheet about said platen.

6. A front-feed machine of the class described having a printing mechanism, a traveling paper carriage, a platen carried by a frame that is movable so that said platen may be moved from a printing position relative to said printing mechanism to a throwback position and vice versa, a line finder movable from an inactive position to an active line finding position relative to said platen, and means selectively conditioned by said paper carriage and operated by said platen frame as said platen is moved from printing to throwback position for moving said line finder to line finding position automatically.

7. A front-feed machine of the class described having a printing mechanism, a traveling paper carriage, a platen carried by a frame that is movable so that said platen may be moved from a printing position relative to said printing mechanism to a throwback position and vice versa, a line finder movable from an inactive position to an active line finding position relative to said platen, line-finder moving means, means selectively conditioned by said carriage and operated by said platen frame as said platen is moved from printing to throwback position for moving said line finder to line finding position automatically, restoring means for returning said line finder to inactive position, said line finder moving means and line finder being constructed and arranged so that as said platen is returned to printing position and as said line finder is moved to inactive position for line finding, said moving means will be disabled so that, upon the next movement of said platen to throwback position, said line finder moving means will not move said line finder unless said moving means is reconditioned by said carriage.

ROBERT L. MULLER.