May 28, 1940. R. L. MULLER 2,202,595

PAPER EQUIPMENT FOR CALCULATING MACHINES

Filed July 23, 1930 6 Sheets-Sheet 1

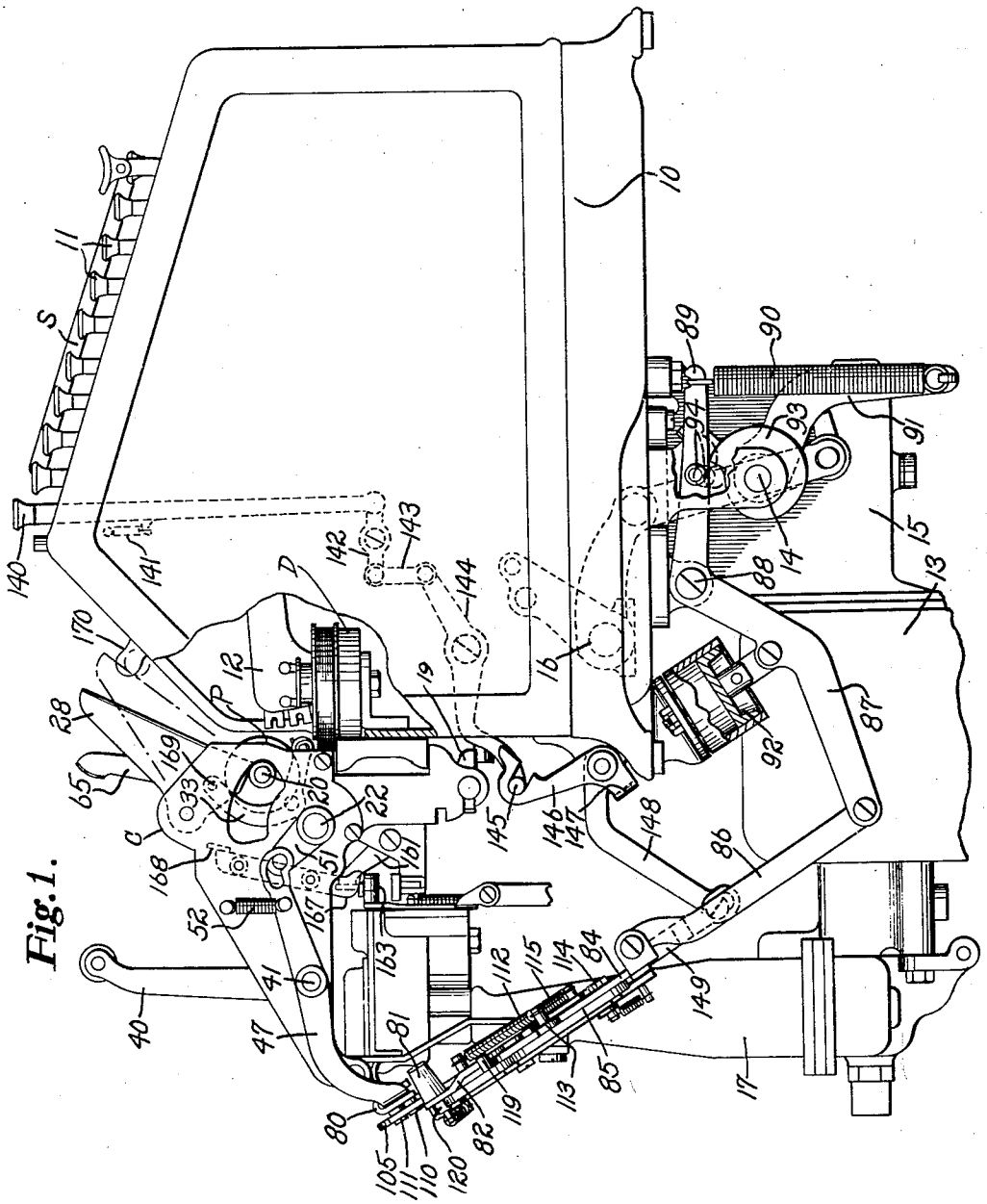


Fig. 1.

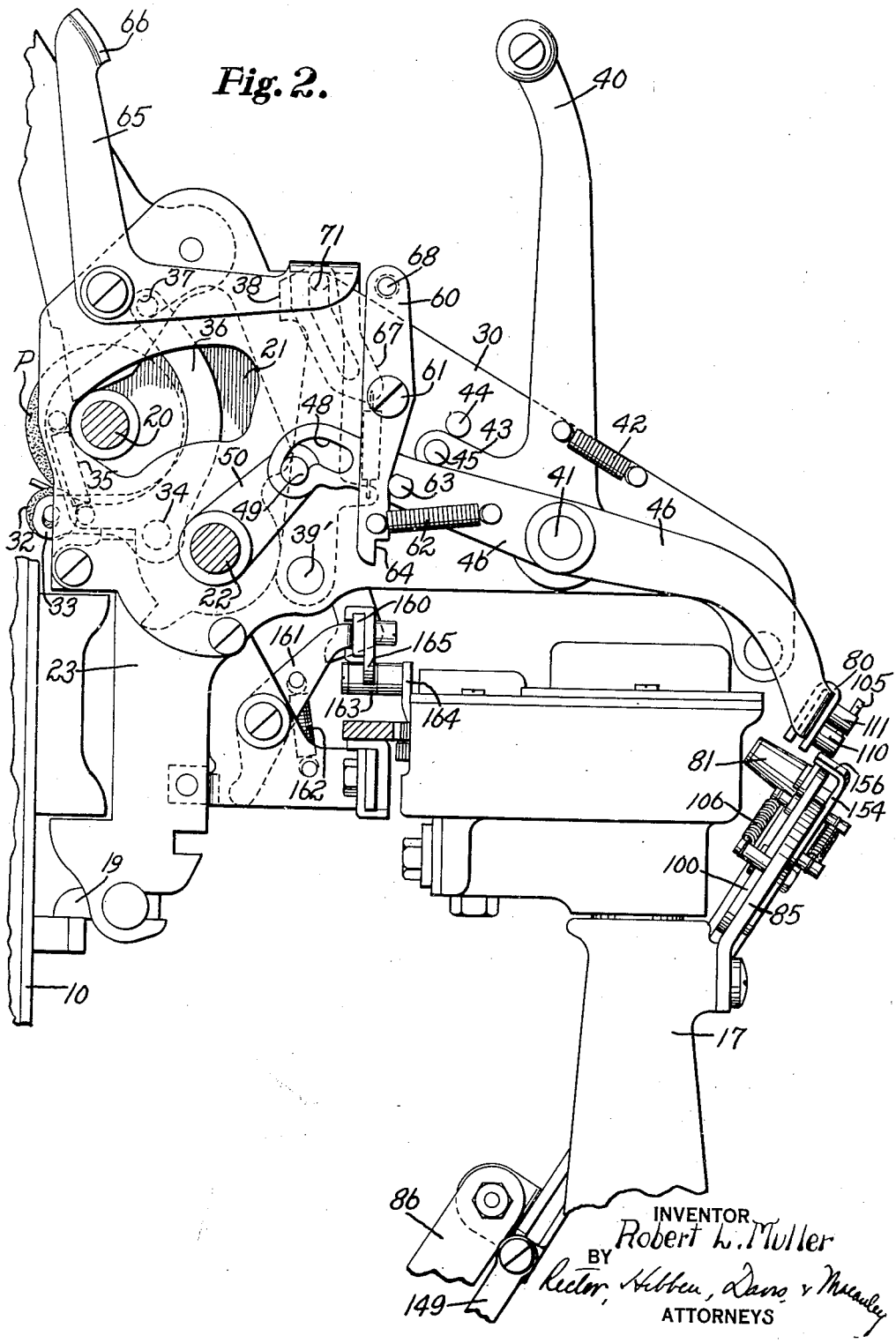
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Fig. 2.



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Fig. 3.

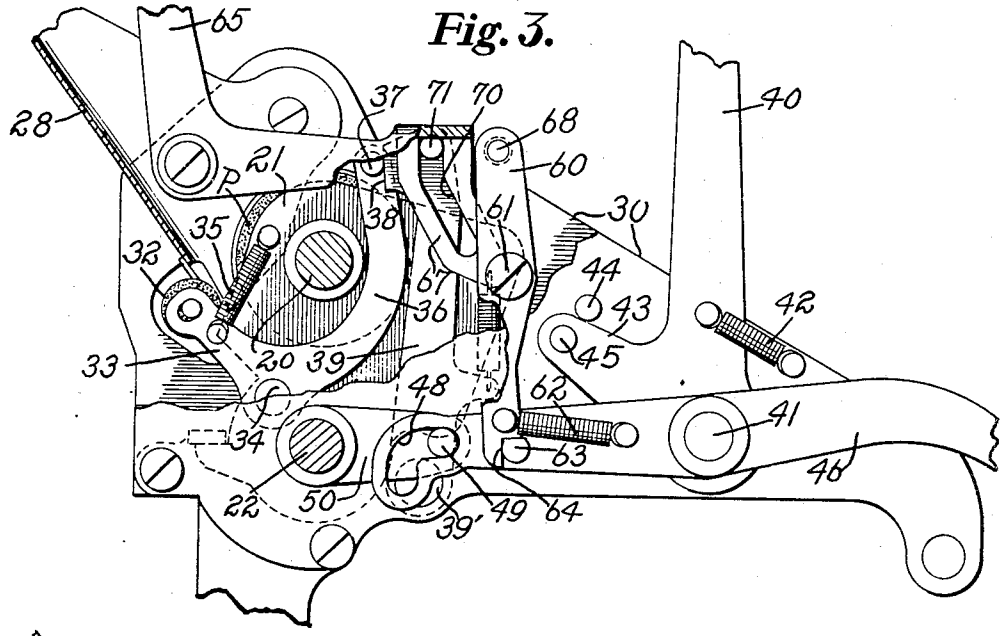
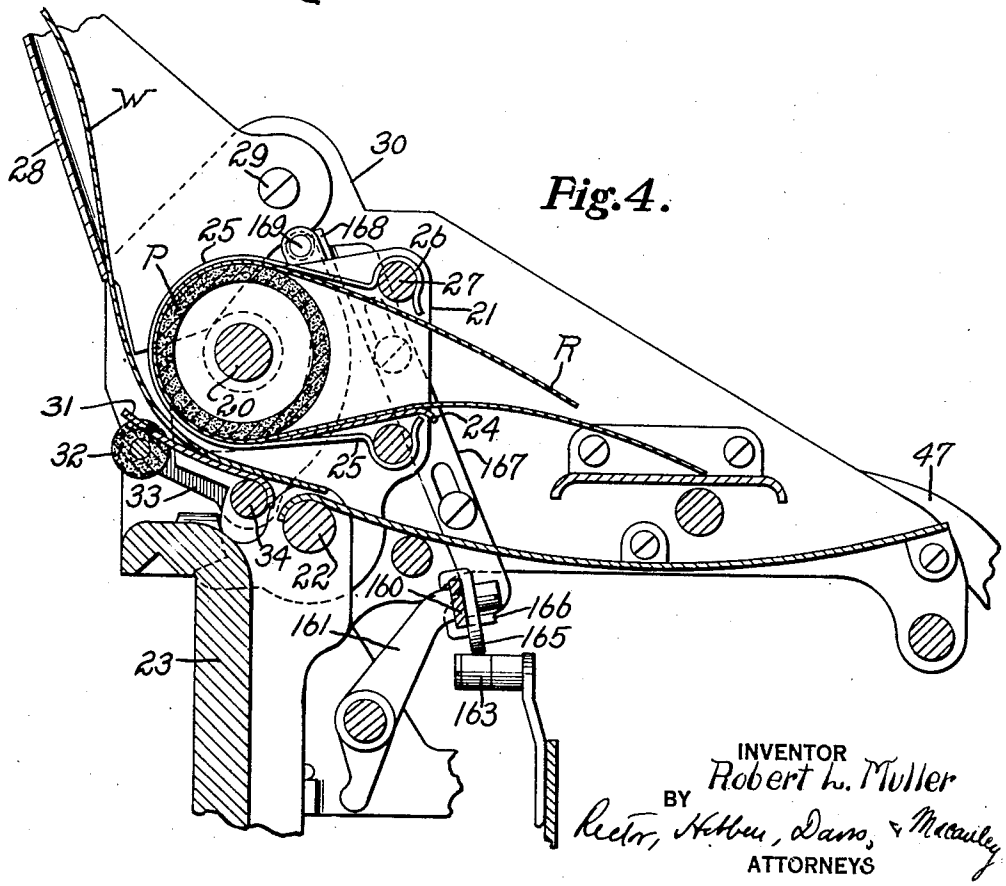


Fig. 4.



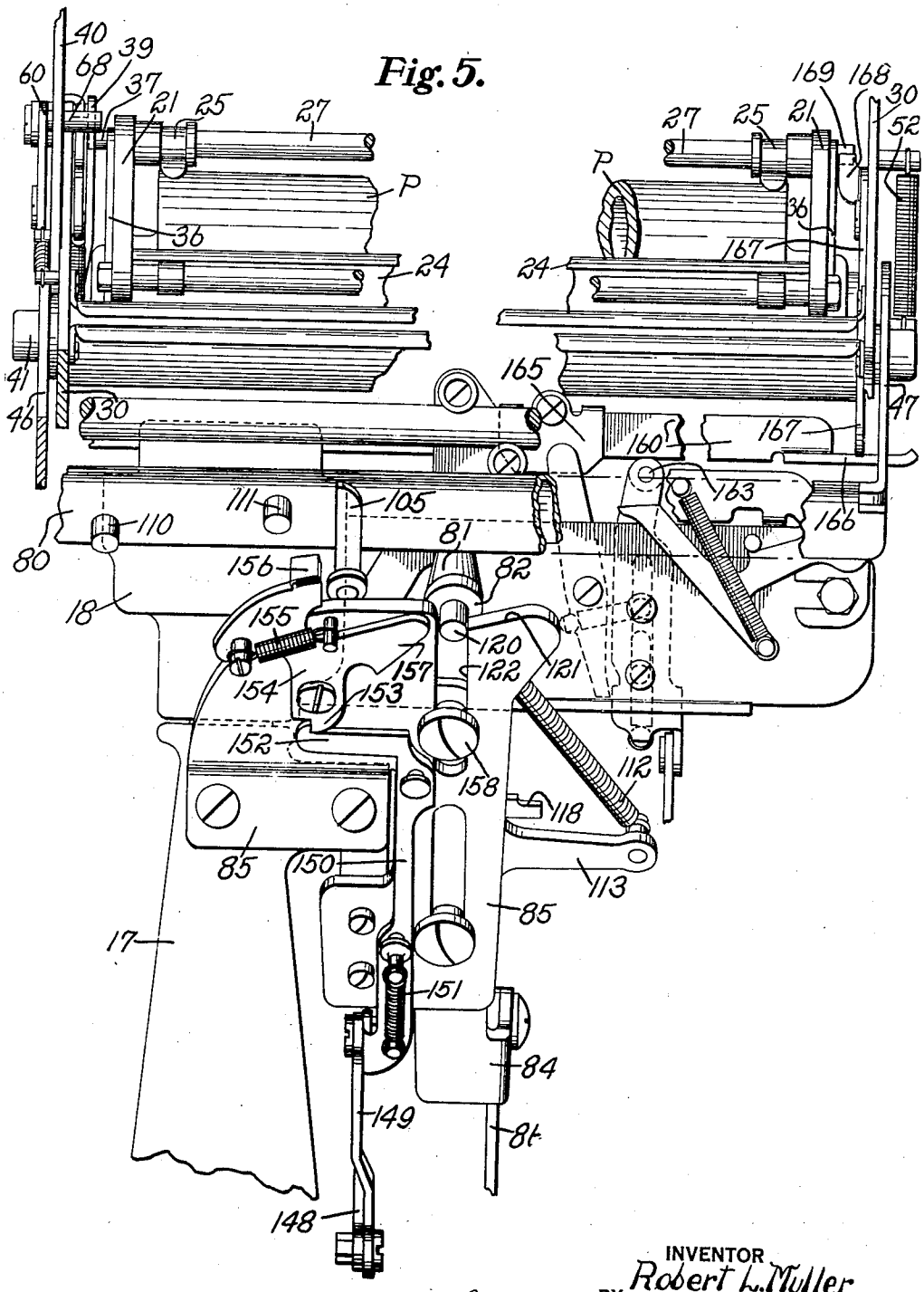
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Fig. 5.



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Fig. 7.

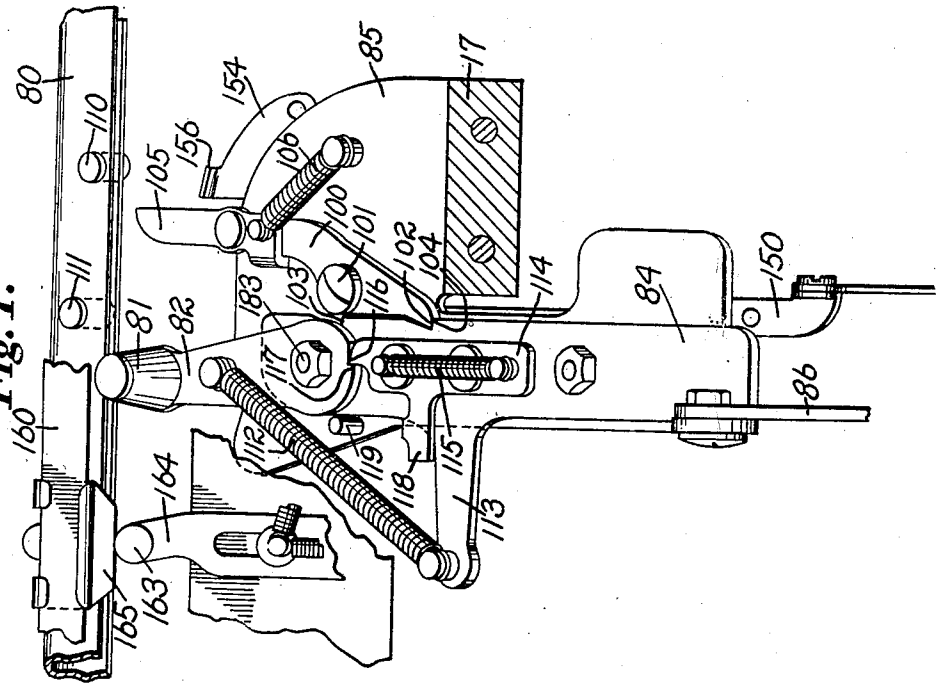
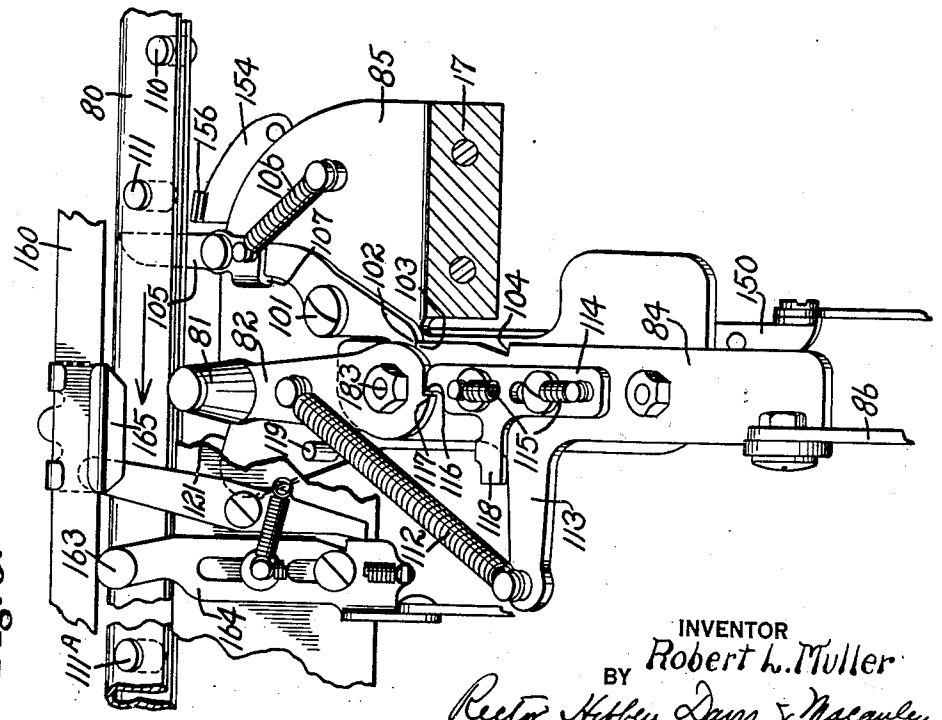


Fig. 6.



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Fig. 9.

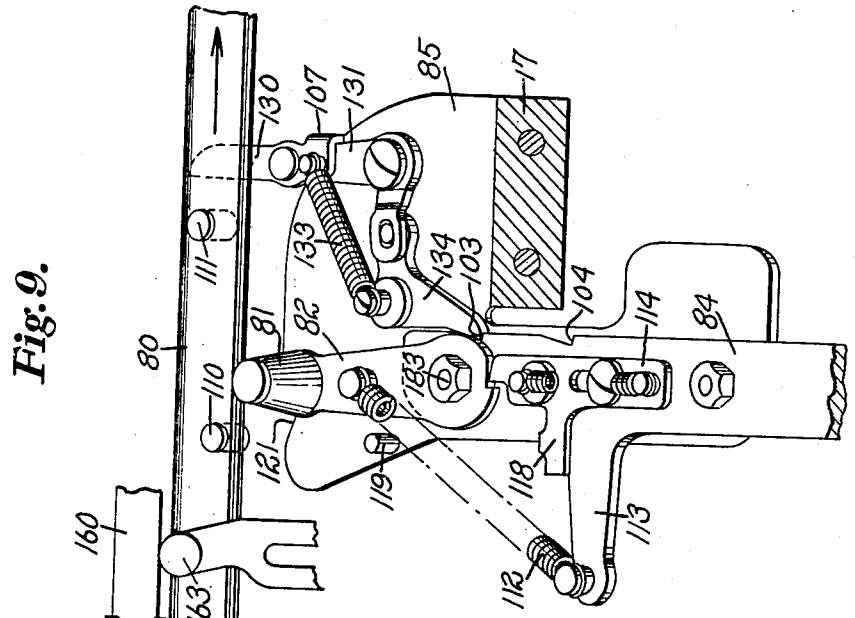
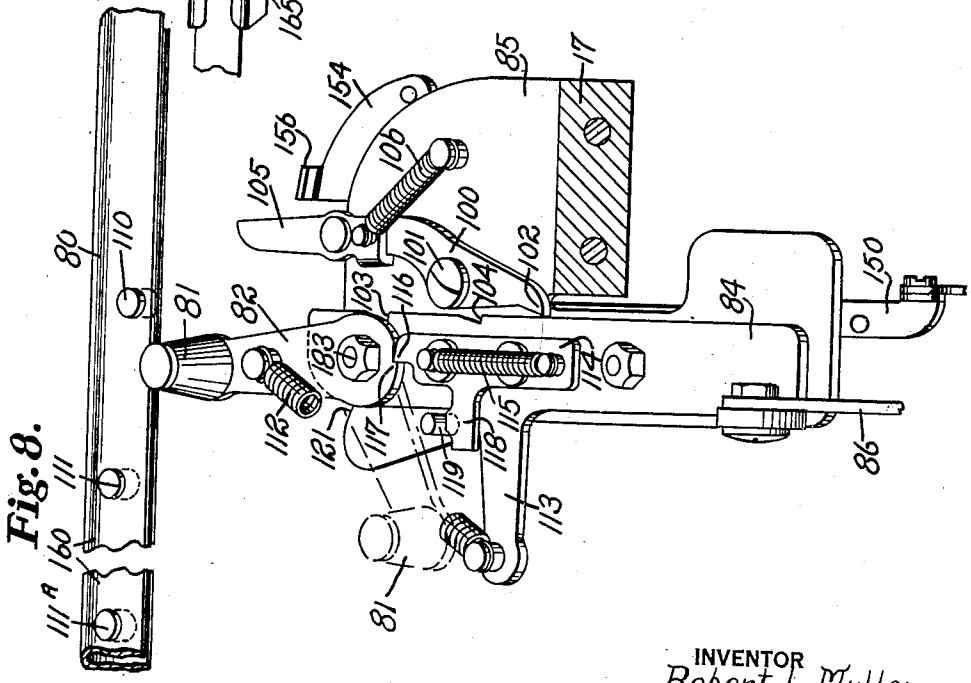


Fig. 8.



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Patented May 28, 1940 2,202,595

UNITED STATES PATENT OFFICE

2,202,595

PAPER EQUIPMENT FOR CALCULATING MACHINES

Robert L. Muller, Detroit, Mich., assignor to Burroughs Adding Machine Company, Detroit, Mich., a corporation of Michigan

Application July 23, 1930, Serial No. 469,957

135 Claims. (Cl. 197—128)

This invention relates to paper equipment for calculating machines of the type used for bookkeeping, accounting, statistical work, and the like where numerous entries have to be made and some of the papers changed from time to time.

In certain classes of bookkeeping and accounting work, it is frequently necessary to keep a running record of all the entries over a given period of time and, during the making of such entries, to insert and remove a number of individual ledger or work sheets on which only a few entries are made. The record sheet is held in the machine during the entire run while the work sheets are inserted and removed from a front-feed throat that may be opened or closed. In order to speed up operations, it is desirable to have the front-feed throat controlled automatically. Equipment for this purpose has already been provided as shown in Trew Patent No. 1,723,668 but, in the Trew construction, the paper carriage actuates the connections that open the front-feed throat. This places an undesirable load on the carriage and also requires a considerable carriage movement. Often, the paper carriage is already burdened with having to actuate a large number of controls which vary in different positions of the carriage. For example, when the carriage is moved to one position, it may be required to move only one small control member; but, when it is moved to another position, it may be required to actuate a half dozen or more devices. The spring for moving the carriage must be adjusted to some predetermined tension. When it is strong enough to move the maximum number of controls, it is too strong to move a small number and the carriage will move against its stop with a bang and jar that is undesirable. On the other hand, if the spring is weakened, the speed of the carriage is decreased and the carriage may stick and fail to move the maximum number of controls. Furthermore, in order to actuate the controls, particularly throat opening, the carriage must move through a sufficient distance to enable the actuating mechanism to operate, which means that the distance between its stationary positions must be wider than might otherwise be necessary. The present invention is directed to an improvement in which the load is removed from the paper carriage. The control can still be by the carriage and, where this control is exercised by movement of the carriage, only a very slight movement is required. Provision is also made for a manual control.

In prior constructions, including the Trew construction above mentioned, it has been necessary, after a new work sheet has been placed in front of the platen while the latter is in front-feed position, to manipulate some lever, latch or key in order to return the platen to printing position. The present invention contemplates making this manual operation unnecessary by the provision of a construction which operates entirely automatically. For example, when the paper carriage reaches a predetermined position, the work sheet is released so that the operator may remove it and replace it by another. He can immediately enter an item upon the keys and give the machine a cycle of operation without paying any attention to the inserted work sheet, the work sheet being automatically gripped about the platen as the machine operates and in proper timed relation to operation of the printing mechanism.

The general object of the invention is, therefore, to provide an improved paper equipment for calculating machines.

A more specific object is to improve the efficiency and speed of operation of paper equipment in a machine of the type in which certain of the papers have to be removed from time to time and replaced by others, as for example, in bookkeeping machines used for posting ledgers, where a continuous record is kept of all the entries and different ledger sheets are inserted and removed from time to time.

Other and more particular objects are to provide an equipment that operates automatically without placing the load on the paper carriage; one that operates automatically under the control of the carriage, and, where movement of the carriage is employed for control, only a very short movement of the carriage is necessary; one that enables the platen to be moved to several positions away from printing position; one that restores the platen to printing position automatically; one that enables the front-feed throat to be closed automatically and one that enables both the platen and the feed rolls to be moved away from each other.

Other objects and advantages will appear from the following specification and drawings.

An embodiment of the invention is shown in the accompanying drawings in which:

Figure 1 is a left side elevation of a calculating machine with the invention applied thereto, the parts being shown in normal position;

Fig. 2 is a right side elevation of the paper

equipment with the parts shown in normal condition;

Fig. 3 is a partial right-side elevation and section showing the mounting of the platen and the controlling devices therefor, the platen being in its "full throw-back" position;

Fig. 4 is a partial right-side elevation and section similar to Fig. 3 with the platen in a "partial throw-back" position;

Fig. 5 is a partial rear elevation with some of the parts cut away to show others more clearly, the parts being shown in normal position;

Fig. 6 is a partial front elevation of some of the automatic controls, the view being taken with the main body of the machine and the carriage omitted, the parts being in normal position;

Fig. 7 is a view similar to Fig. 6 with the parts in the position they occupy when the platen occupies a "partial throw-back" position;

Fig. 8 is another view similar to Fig. 6 showing the parts in the position they occupy when the platen is in its "full throw-back" position;

Fig. 9 is another view similar to Fig. 6 showing a modified construction of controls;

The invention is shown applied to the well-known Burroughs calculating or bookkeeping machine indicated generally by the numeral 10 in Fig. 1. This machine is equipped with the usual mechanisms provided on a machine of this type. Not all of these have been illustrated and described because they are well known in the art and shown in numerous prior Burroughs patents. The machine is illustrated only in a general way and only a brief description of the parts more particularly associated with the present invention will be given.

General Features of Machine

The machine, which is illustrated generally in Fig. 1, is of the type which, after it is properly conditioned, is given a cycle of operation during which its various functions are performed. It may be cycled manually by a hand crank but most of the present day machines are cycled by a power operated driving means which is actuated by an electric motor 13 acting through a clutch contained in the housing 15. The motor and clutch are normally controlled by a motor bar S which, when depressed, causes the motor to give the machine a cycle of operation. The motor and its controls are described in detail in Vincent Patent No. 866,750 where the motor is shown as a continuously running motor. When the machine is given a cycle of operation by the motor, the main drive shaft 14 is rotated through a single revolution, said shaft being connected by suitable cranks, links and levers, some of which are shown in dotted lines in Fig. 1, to one of the main shafts 16 of the machine.

An amount indexing means is provided comprising a plurality of depressible amount keys 11 upon which items may be indexed for entry into the machine, a suitable registering mechanism (not shown) of the usual Burroughs type being provided.

The machine has a printing mechanism for printing the amounts entered as well as the totals thereof, a portion of said printing mechanism being shown at 12 in Fig. 1. Normally, at an appropriate time during the machine cycle, generally near the end of the first half of the cycle, the printing mechanism is operated to drive its type against record material held about a platen P. This printing mechanism is described in detail in Burroughs Patent No. 505,073.

Provision is made for enabling the printing to occur in different columns on record material supported about the platen P. This is accomplished by means of a columnar-printing control means in the form of a traveling paper carriage C, together with means for moving and controlling the movement of said carriage. The carriage C, which supports the platen P, is urged across the machine to the left, viewing the machine from the front, by a spring drum D (Fig. 1) and its movement is controlled by a tabulating mechanism, one of the tab stops 19 of which is shown in Figs. 1 and 2. Normally, near the end of each machine cycle, the carriage moves from one stationary position to another. This movement may be from one column to a column immediately adjacent or it may be to some other column, the control being variable as described, for example in Rinsche Patent No. 1,580,534. The carriage is arrested by the tab stops 19, shown in Figs. 1 and 2 and also in said Rinsche patent. Said stops are freely adjustable so that the stationary positions of the carriage and the width of the columns may be readily changed. When it is desired that the paper carriage remains stationary, the tabulating mechanism may be disabled by the usual "carriage normal" key (not shown).

The carriage may be returned to the right by hand or it may be returned by a motor through mechanism contained in the housings 17 and 18 and described in detail in said Rinsche Patent No. 1,580,534.

The machine may be conditioned to perform various functions either manually or automatically, the automatic control being by the paper carriage C, which, in its movement to different positions, conditions the machine for various functions as is well known in the art and as disclosed, for example, in Muller 1,397,774.

Platen mounting

The platen P is not only mounted so that it may rotate for line spacing but also so that it may be moved from its normal printing position adjacent the printing mechanism to an "out-of-printing" or "throw-back" position to facilitate insertion or removal of papers as will be presently explained. In the present machine, the platen may be moved to two different throw-back positions, one of which is called the "partial or intermediate throw-back" and the other the "full throw-back" position.

The platen P is fixed to a shaft 20 (Fig. 4) that is journaled in a set of pivoted end plates 21. The end plates 21 are fixed to a shaft 22 that is journaled in the sliding raceway frame 23. The platen is urged toward printing position in a manner that will be described later.

The platen is thus mounted so that it is not only free to rotate, but it may also be moved from its printing position shown in Fig. 2, to different positions removed from its printing position, such as the "full throwback" position shown in Fig. 3 and the "partial throwback" position shown in Fig. 4, either of which may also be called a front-feed position as it is in these positions that one work sheet may be removed and another front-fed into position.

Provision is made for passing a record sheet R about the platen from the rear. This record sheet is guided under the platen from the rear by an apron 24 and it is held about the platen by flexible strips 25 of which there is one near each end of the platen. These strips have rent ends

26 which are removably snapped over a shaft 27 carried by the movable end plates 21 that support the platen. The record sheet thus moves with the platen as it moves away from printing position and it is held about the platen by the flexible strips 25.

Provision is also made for feeding work sheets W about the platen from the front and, for this purpose, a front-feed paper chute or table 28 is used which is pivoted at 29 to the side plates 30 of the paper carriage. When the platen is in printing position, the paper chute 28 occupies a substantially vertical position as shown in full lines in Fig. 1. This may be called the "work-sheet-holding" position of the chute, or the "printing position", as this is the position the chute occupies when an inserted work sheet is held in position and it is the position the chute occupies while a printing operation of the printing mechanism takes place. As the platen moves from printing toward front-feed position, the chute is swung clockwise (Fig. 1) toward the body of the machine until it occupies an inclined position close to and substantially parallel with the inclined rear portion of the machine casing as shown in dot-and-dash lines in Fig. 1. In this position, the chute is adapted to receive and guide work sheets bottom end first into front-fed position relative to the platen. This position of the chute may be called the "work-sheet-receiving" position. The inserted work sheets are, in the embodiment shown, guided under the platen by a suitable apron 31 shown in Fig. 4.

The front-feed chute is pivoted so that it tends to move to the dot-dash position of Fig. 1 by gravity. It is moved from this position, which is the work-sheet-receiving position, to its work-sheet-holding or printing position by engagement of the chute with the platen shaft 20. For example, referring to Figs. 3 and 4, it will be observed that the chute has a cam edge positioned to engage the shaft 20. When the platen is in front-feed position, as illustrated in Fig. 3, the paper chute occupies its work-sheet-receiving position, but, when the platen is moved to its Fig. 4 position or printing position, the shaft 20 engages the cam edge of the paper chute and swings the chute on its pivot 29 to its sheet-holding or printing position. An important function of this chute is that it not only enables a work sheet to be fed bottom end first in front of said platen but, as the platen is moved to printing position, the paper chute moves the front unfed end of the inserted work sheet to vertical position and acts as a sheet-holding means or a sheet-engaging means to hold the inserted sheet about the platen. This is best illustrated in Fig. 2 where it will be observed that the bottom edge of the chute 28 is moved far enough to the rear of the front face of the platen to move the inserted work sheet about the platen and hold it in a substantially vertical position. It thus functions in place of a set of feed or pressure rolls or other holding devices for holding the unfed end of a work sheet about the platen.

A front-feed throat is provided for the receipt of work sheets, which throat may be moved from closed to open position and vice versa as will later appear. For this purpose a plurality of paper holding devices in the form of feed or pressure rolls 32 are provided for cooperation with the platen. These pressure rolls 32 are journaled on the ends of arms 33 fixed to a shaft 34 journaled in the movable end plates 21. The pressure rolls are urged into engagement with the platen by springs 35, one of which is shown in Fig. 3. The right hand arm 33 (Fig. 3) has an extension 36 on the end of which is a stud 37 positioned to engage an abutment 38 on the end of an arm 39 pivoted at 39' to one of the side plates 30 of the paper carriage. As the platen is moved away from printing position the shaft 34 carrying the pressure roll arms 33 moves with it and stud 37 strikes the abutment 38. This blocks movement of the arm 33 having the extension 36 and, since this arm is fixed to shaft 34, further movement of the platen away from printing position causes shaft 34 to turn thereby moving the pressure rolls away from the platen. The "throat" that receives the front-fed work sheet is thus quickly and widely opened to permit one sheet to be readily removed and another inserted.

The platen may be moved away from printing position to front-feed positions by manipulating a hand lever 40 (Fig. 3) which operates connections as follows:

The lever 40 is loosely pivoted on a cross shaft 41 supported by the carriage side plates 30, the lever being urged clockwise by a spring 42 and its clockwise movement being limited by the engagement of a projection 43 on the lever with a limit stud 44 on the right hand plate 30. The projection 43 carries a stud 45 adapted to engage the edge of a lever 46 fixed to the shaft 41. A similar lever 47 is fixed to the opposite end of shaft 41 as shown in Fig. 1. The forward end of the lever 46 is provided with a curved cam slot 48 in which is positioned a stud 49 on the end of an arm 50 fixed to the shaft 22 to which the side plates 21 carrying the platen are also fixed. Another arm 51, similar to arm 50 is fixed to the opposite end of shaft 22 and this arm has a stud operating in a curved slot in the end of arm 47. These slots are curved so that, when the parts are in the position of Fig. 2, the platen is latched in printing position. This is due to the fact that the studs 49 are in such position in the slots that any tendency of the platen to move out of printing position is resisted by said studs engaging the rear edges of the slots. The operation is as follows:

When the operator pulls the lever 40 forward from its Fig. 2 position, the stud 45 engages the edge of lever 46 and rocks the shaft 41 counterclockwise. This also moves lever 47 counterclockwise. The counterclockwise movement of levers 46 and 47 first unlatches the platen and then, as the studs 49 engage the upper curved ends of slots 48, cams the arms 50 and 51 clockwise which rocks shaft 22 clockwise, thereby causing a corresponding movement of the plates 21 carrying the platen P so that the platen is rocked clockwise away from its Fig. 2 position toward its Fig. 3 and Fig. 4 positions. The platen is urged toward its printing position by a spring 52 (Fig. 1) acting on lever 47 and, hence, if no provision were made to prevent it, the platen would return to printing position when the operator released the lever 40.

In order to hold the platen in front-feed position a latch 60 is provided which is pivoted at 61 to the carriage side plate 30. This latch is urged counterclockwise by a spring 62 connected at one end to a stud on the latch and at its other end to a stud on the lever 46. Movement of the latch 60 is normally prevented by the engagement of its edge with a stud 63 on lever 46. The latch 60 has a shoulder 64 adapted to engage over a flat face of the stud 63 on lever 46 when the lat-

ter is swung downward to the position of Fig. 3. This movement of the latch 60 does not occur until the lever 46 has been moved downward far enough to move the platen to its "full throw-back", or full front-feed, position, but, when the platen is moved to this position, the latch automatically snaps to its Fig. 3 position and prevents return of the lever 46 thereby holding the platen in front-feed position.

The latch 60 is preferably released by hand through the medium of a finger or thumb operated releasing lever 65 in the form of a bell crank. One end of this bell crank lever has a thumb piece 66 and the other end has an offset projection provided with a nose 67 adapted to engage a stud 68 on the upper end of the latch 60. Referring to Fig. 3 it will be evident that, if the bell crank lever 65 is swung counterclockwise, its nose 67 will contact the stud 68 and cam the latch 60 clockwise. The movement is sufficient to release the latch whereupon the platen will move to printing position under the influence of spring 52 (Fig. 1) assisted by its own weight. The spring 52 swings the arms 50 and 51 counterclockwise and moves levers 46 and 47 clockwise to their Fig. 2 position, the lever 40 having been returned by means of spring 42 as soon as released by the operator.

The pressure rolls are also released to close the front-feed throat by the lever 65. Referring to Fig. 3, the nose 67 of lever 65 is provided with a cam slot 70 in which is positioned a stud 71 on the end of lever 39. When lever 65 is moved counterclockwise the arm 39 is rocked clockwise and the abutment 38 is moved away from stud 37 thereby permitting the feed roll arms to swing toward the platen under the influence of the springs 35, the timing being such that the feed rolls are released to hold the paper against the platen before the nose 67 acts on the stud 68 to release the latch 60.

The description thus far given has been directed mainly to a construction in which the platen is moved from its printing position to a "full throw-back" position where it is latched, such movement and the release of the platen being hand controlled. This construction has been explained first because an understanding of it is necessary in order that the automatic control may be clear. In operation, the automatic control is used mostly but the hand control has been provided for use where desired.

Automatic full throw-back and throat opening

As previously mentioned the platen is automatically moved away from printing position without placing a load on the carriage and without requiring anything but a very small carriage movement.

The levers 46 and 47 extend rearwardly for a considerable distance and, at their rear ends, they support a cross bail 80, portions of which are shown in Figs. 2, 5, 6, and 7. Positioned to engage the lower edge of this cross bail, but normally slightly below it, as shown in Fig. 2, is a conical shaped roller 81 (Fig. 6) carried on the end of an arm 82 pivoted at 83 on a slide plate 84. This slide plate 84 is mounted on a stationary supporting plate 85, the plate being fastened to the housing 17 of the carriage return mechanism (see Fig. 2). It will be evident that, when the slide 84 is moved upwardly, the roller 81 will engage the bail 80 and move the latter upward which will rock the levers 46 and 47 counterclockwise to first unlatch the platen and to then move said platen away from printing position in the manner previously explained. Provision is made for moving the slide 84 upwardly under the control of the operating means of the machine through connections as follows:

Connected to the slide 84 is a link 86 whose lower end is connected to one arm 87 (Fig. 1) of a bell crank lever pivoted at 88 to a bracket on the machine frame. The other arm 89 of this bell crank lever has one end of a relatively strong spring 90 connected to it. The other end of said spring is connected to one arm of a stationary bracket 91 that supports the shaft 14 and the spring tends to rock the bell crank lever 87—89 clockwise. Movement of the bell crank lever is damped by means of a dash pot 92 which may or may not be used, its function being to prevent the spring 90, which is rather strong, from operating the parts too suddenly.

Mounted on the drive shaft 14 between the arms of its supporting bracket 91 is a snail cam 93 positioned to act on a stud 94 on the arm 89 of the bell crank lever 87—89. This snail cam makes one revolution for each operation of the machine, its direction of rotation being clockwise as viewed in Fig. 1. In the Burroughs machine, the drive shaft 14 with the snail cam on it completes its revolution slightly before the general operating mechanism of the machine completes its cycle. If the bell crank lever 87—89 should be held in the position shown in Fig. 1, the cam 93 has no effect on it during rotation of the shaft 14. However, when the bell crank lever occupies a position such that the stud 94 is in one of the dotted positions of Fig. 1, the snail cam engages the stud upon rotation of shaft 14, and the lever 87—89 will be cammed counterclockwise and the spring 90 retensioned. The snail cam 93 is positioned so that it will rock the lever 87—89 counterclockwise during the first part of the revolution of shaft 14 or during the first half cycle, or forward stroke, of the machine. The spring 90 is thus tensioned by power from the motor driving means during the first half of the machine cycle and said power is available for use during the second half of said cycle. This indirect application of the power of the motor drive through a spring mechanism is advantageous in that it gives a range of adjustment as to the time when the power may be applied. It has the further advantage that the power may be applied under the control of a key without requiring a machine cycle as will be presently explained.

A latching device normally prevents upward movement of the slide 84 and this normally holds the bell crank lever 87—89 in its Fig. 1 position. This latching device includes a latch 100 (Fig. 6) pivoted at 101 to the stationary supporting plate 85. On its lower end the latch 100 has a nose 102 adapted to engage an upper notch 103 or lower notch 104 in the slide 84, or to occupy a free position such as illustrated in Fig. 8. The other end of the latch 100 carries a pass-by pawl 105 pivoted to the end of the latch and urged counterclockwise as viewed in Fig. 7 by a spring 106, the pass-by pawl being provided with a suitable lug 107 limiting its counterclockwise movement. The normal position of the parts is shown in Fig. 6 where the nose 102 of the latch 100 engages the upper notch 103 in the slide 84 to hold the slide in its lower position.

The latching device is preferably controlled automatically by the paper carriage but provision is made for control by a special key on the keyboard if the latter type of control is desired.

The automatic control by the paper carriage is effected by means of studs on the bail 80 which travels with the carriage. Two of these studs 110 and 111 are shown in Figs. 6 and 7. As the paper carriage moves from right to left as viewed in Fig. 6, one of these studs will, at the appropriate time, engage the edge of the pass-by pawl 105 and release the latch 100 whereupon the spring 90 (Fig. 1) acting through the bell crank lever 87—89 and the link 86, will move the slide 84 upward causing the bail 80 to be raised and the platen to be moved away from the printing position. During the return movement of the paper carriage the pass-by pawl 105 will yield and the studs will not have any effect in releasing the latch.

It will be recalled that the carriage tabulates to a new columnar position near the end of a cycle of operation of the calculating machine. The studs 110 and 111 on the bail 80 which control the latch 100 are preferably positioned so that the latch is released just prior to the time the carriage engages the stop that arrests it in the columnar position to which it is moving. The sequence of operations is that, near the end of a cycle of operation of the machine, the carriage tabulates to a new columnar position and just before the carriage reaches this position the latch 100 is released whereupon the automatic throw-back mechanism operates to move the platen from printing to front-feed position and the front-feed throat to open-throat position so that the operator can remove the necessary papers and insert new ones. It has been found that, when the parts are so adjusted, the power operated throat-opening means does not really become effective to perform its function until the paper carriage reaches a stationary position. This is due to the fact that the paper carriage is moving very rapidly at the time the latch is tripped and that said carriage completes its travel before the parts have had a chance to operate. The rapidity of movement of the carriage depends in part upon the width of the column or columns through which it moves since the carriage accelerates under the action of its spring. When the latch 100 is released, the spring 90 must first overcome the inertia of the parts and move the lever 87—89 against the retarding action of the dash pot 92 which resists too sudden movement. This lever 87—89 must move the slide 84 a short distance before roller 81 will engage the bail 80. As the bail 80 moves, its arms 46, 47 must first move an appreciable distance to unlatch the platen. After these movements and the lost motion are overcome, the platen starts to move but the front-feed throat is not opened until the platen is near the end of its rearward movement. In fact, it has been found that, if the latch 100 is released when the carriage is within ⅛ inch of the stationary position toward which it is moving, assuming an average column width of 1½ inches, the platen will just start to move as the carriage reaches a stationary position but no real movement of the throat-opening means will have occurred and the throat is not opened until quite an appreciable period after the carriage is stationary. If the latch is released when the carriage is within ¼ inch of the stationary position toward which it is moving, the platen will start to move twelve-thousandths of a second before the carriage reaches its stationary position, but the throat will not be opened until a considerable time after the carriage is stationary. While the throat is thus actually opened after the carriage is stationary in its new columnar position, the opening is so rapid that it ordinarily takes place in sufficient time to suit the wishes of the operator. On the other hand, if an earlier opening is desired, it is possible to change the relative position of the studs 110 and the tab stops 19 so that the latch 100 will be tripped out earlier in the travel of the carriage in which event the throat may be opened slightly earlier, and, where there is a long travel of the carriage, it can take place before the carriage reaches its stationary position. This adjustment may be obtained very easily as the tab stops 19 are freely adjustable as disclosed in many prior Burroughs patents, for example, Rinsche 1,580,534.

Since the snail cam enters into the operation of the parts during a machine cycle, an explanation of the timing with respect to this cam will be made. Assume that the throat has been opened in a preceding cycle and that the stud 94 is in engagement with the low part of the snail cam 93. Assume also that the operator has inserted a new sheet and operated the hand lever 65 to cause the throat to close. He then depresses the motor bar which causes the machine to be given a cycle of operation during which the cam 93 is given a revolution. This cam is shaped so that, during the first half cycle, the lever 87—89 is rocked to tension spring 90, whereupon the latch 100 acts to latch the slide 84 in position. In other words, during the first half cycle, the power of the motor drive is temporarily stored ina spring mechanism which is cocked, ready for action. The snail cam continues its movement during the remainder of the cycle and reaches the end of its travel slightly before the general operating mechanism of the machine completes its movement. If the latch 100 were released immediately at the beginning of the second half of the machine cycle, the throat-opening means would not operate immediately because the stud 94 would engage the high portion of the cam 93. The cam 93 has to move a sufficient distance to place its low point below the stud 94 before the spring 90 can rock the lever 87—89 clockwise. The cam 93 thus exercises control of the operation of the throat-opening means not only in the matter of tensioning the spring but also in the timing of the operation. Where the latch 100 is tripped by the carriage just before the carriage reaches its stationary position, the cam 93 completes its rotation at about the time or slightly before the latch 100 is released, because the paper carriage is not tabulated until toward the end of the machine cycle.

From the above, it will be apparent that the releasing of the latch 100 by the paper carriage places no appreciable load on said carriage, and the platen may be thrown back and the front-feed throat opened without creating any difficulties in the matter of carriage movement. If the parts are adjusted to obtain control by the movement of the carriage, then only a small movement is required as distinguished from a very considerable movement that is required in a carriage-actuated device.

After the operator has inserted a new work sheet in position he desires to have the sheets gripped against the platen and the platen returned to printing position. The slide 84 is not restored until the machine is operated and if the roll 81 were to remain in engagement with the bail 80 it is evident that, even though the releasing lever 65 were manipulated, the platen

could not move back to printing position because it would be held by the throw-back mechanism engaging the bail 80. Accordingly, provision is made for disabling the effective connection between the throw-back or throat-opening mechanism and the bail 80 during the latter part of the movement of the throw-back mechanism.

Referring to Fig. 6, it will be observed that the arm 82 carrying the roller 81 is urged counterclockwise by a spring 112 connected at one end to a stud on the arm 82 and at its other end to a stud on a lateral projection 113 on the slide 84. The arm 82 is normally latched against movement by a small sliding latch plate 114 mounted to slide on the plate 83 and urged upward by a spring 115. The upper end of this latch plate has a nose 116 adapted to engage a shoulder 117 on the hub of the pivoted arm 82. The normal position of the parts is that shown in Fig. 6 where the shoulder 117 engages the sliding latch 116 and the arm 82 is restrained against movement under the influence of the spring 112.

During the latter portion of the upward movement of the slide 84, and after the platen has moved far enough away from printing position to permit it to be latched against return, a lateral projection 118 on the slide latch 114 engages a stationary stud 119 on the supporting plate 85. Upward movement of the latch plate 114 is thus arrested while the slide plate 84 continues its upward movement slightly, carrying the arm 82 along with it. This disengages the shoulder 117 from the nose 116 of latch 114 whereupon the spring 112 swings the arm 82 around to the dot and dash position of Fig. 8. This disables the effective connection between the throw-back mechanism and the bail 80 and frees the bail for downward movement. Now, when the operator trips the thumb latch 65, the platen may return to printing position without any interference by the automatic throw-back mechanism.

The pivoted arm 82 is automatically restored to normal during the lowering movement of the slide 84. As the slide 84 moves downward the edge of arm 82 engages the stud 119 (see Fig. 8) which acts to swing the lever clockwise. During the latter portion of the downward movement of slide 84 a stud 120 engages a cam edge 121 on the plate 85 (Fig. 5) which cams the arm 82 further clockwise until the stud 120 enters a slot 122 in plate 85. As the parts reach this position the nose 116 of latch 114 snaps over the shoulder 117 and the arm 82 is latched in its Fig. 6 position. The arm 82 is cammed slightly past latch 114 so as to give the latch plenty of clearance to snap to latching position. The position of the parts is shown in Figs. 6 and 9 where it will be observed that the arm 82 is really held in position by stud 120 until the plate 84 moves upward slightly whereupon the latch 114 acts.

From the above it will be seen that the platen is moved from printing to front-feed position and the front-feed throat opened by a throw-back mechanism actuated by power derived from the operating means for the machine and without placing any load on the carriage. The operation is entirely automatic under the control of the carriage and the construction is such that the effective connection between the throw-back mechanism and the platen is disabled after the platen has been moved to front-feed position so that the throat may be closed and the platen returned to printing position without interference from the throw-back mechanism. The parts are restored to normal during a succeeding operation of the machine and without any attention on the part of the operator.

Automatic control during return of carriage

It may be desired to automatically move the platen from printing to front-feed position when the carriage moves from left to right instead of from right to left. For example, in some machines a number of entries may be made on the paper after which the carriage is automatically returned a short distance or the full distance and it may be desired to move the platen away from printing position and open the front-feed throat as the carriage is being returned. The modification for accomplishing this result is shown in Fig. 9.

In this construction the pass-by pawl 130, which is similar to the pass-by pawl 105, is mounted on the end of a bell crank lever 131 pivoted at 132 to the supporting plate 85, the pass-by pawl being urged clockwise by a spring 133. The bell crank lever has a pin and slot connection with a latch 134 which cooperates with the notches in the slide plate 84 in the same manner as the latch 100 previously described.

The operation of this form of carriage control is the same as that first described except that, in this case, the latch 134 is released by the studs 110 and 111 when the carriage moves from left to right as viewed in Fig. 9 instead of when it moves from right to left.

MANUAL CONTROL OF POWER-OPERATED THROW-BACK AND THROAT-OPENING MECHANISM

While the machine is ordinarily adjusted to operate automatically without requiring any attention on the part of the operator, nevertheless he may desire, at times, to have the platen thrown back and the front-feed throat opened in order that he may either adjust the position of a sheet, or remove it, or for some other purpose. Provision is made for enabling him to do this at his option in any position of the carriage by simply depressing a special key on the keyboard.

Referring to Fig. 1, a special key 140 is provided which key is normally urged upward by a spring 141. The lower end of the key is connected to one end of a pivoted lever 142 that in turn is connected by means of a link 143 to one end of a pivoted lever 144. The other end of the lever 144 carries a stud 145 operating in a slot in one arm 146 of a pivoted yoke 147 whose other arm 148 is connected by a link 149 to a sliding latch 150 (Fig. 5) urged upward by a spring 151, connected at its lower end to a stud on the latch 150 and at its upper end to a stud extending through a slot in the latch 150 into the supporting plate 85. The upper end of this latch 150 has a nose 152 engaging a shoulder 153 on a pivoted tripping member 154 urged clockwise by a spring 155. The member 154 has a lateral lug 156 adapted to engage the pass-by pawl 105 as will be evident by referring to Fig. 5.

When the key 140 is depressed the yoke 147 is rocked counterclockwise which pulls down on the link 149 and moves the latch 150 to its released position. This releases the pivoted member 154 which is then moved clockwise by spring 155 whereupon the lug 156 strikes the pass-by pawl 105 and releases the latch 100. When this occurs the automatic throw-back mechanism moves the platen from printing to front-feed position and opens the front-feed throat in the manner heretofore described.

In order to restore the member 154 to normal position, it is provided with a projecting nose 157

which, when member 154 moves clockwise in Fig. 5, moves into the path of a stud 158 on slide 84. When slide 84 moves upward after being released, stud 158 strikes nose 157 and returns the member 154 counterclockwise far enough to permit nose 152 on latch 150 to engage behind shoulder 153 to hold member 154 in its restored position.

Automatic closing of throat and return of platen to printing position

Speed is an important factor when a machine of the character described is used on certain classes of work. It is desired to leave the operator as free as possible to do nothing but manipulate the amount keys to make the proper entries. In the construction heretofore described, the platen is automatically moved from printing to front-feed position and the front feed throat opened when the paper carriage reaches predetermined columnar positions so that the operator may remove a sheet such as a ledger sheet and insert a new one. After this has been done, it is necessary for him to manipulate the thumb latch 65 to release the platen and close the front-feed throat.

In the present invention the manipulation of the thumb latch is eliminated by the mechanism about to be described so that the operator need only insert a new ledger sheet and then proceed with the entry of items and operation of the machine, the return of the platen and the closing of the front-feed throat being taken care of automatically by the machine itself.

Referring to Figs. 6 and 7, it will be observed that the studs 110 and 111 on the bail 80 are located at different heights on the bail. As the paper carriage moves from right to left in said figure, the stud that engages the pass-by pawl 105 eventually passes off the end of the pawl allowing the latter to be returned by the spring 106. If the stud is located in a relatively low position as is the stud 110, the pawl 105 with its latch 100 is held in a counter-clockwise position for an appreciable length of time which is sufficient to allow the slide 84 to move upward to the position illustrated in Fig. 8. If, however, the stud is located in a higher position, as shown for stud 111, the pawl 105 with its latch 100 is moved counter-clockwise only momentarily. The latch is almost immediately released whereupon it is snapped back to position in time to engage the lower notch 104 of slide 84 as shown in Fig. 7. Movement of the throw-back mechanism is thus arrested after it has been only partially completed. During such movement, the roller 81 moves the bail 80 upwardly which moves the platen away from printing position in the same manner as previously described but the platen is not moved as far. Instead it is moved to an "intermediate" or "partial throwback" position. The movement of the roller 81 is not sufficient to cause the latch 114 to release arm 82, with the result that the arm 82 with its roller 81 remains in a vertical position and holds the bail 80 in the partly raised position to which it has been moved.

The movement of the bail 80 and of the levers 46 and 47 is not sufficient to move the platen P far enough to permit the latch 60 to latch the platen in the position to which it has been moved. Instead, the parts are moved to the Fig. 4 position where they are held by the throw-back mechanism through the engagement of the roller 81 with the bail 80. Provision is made, as hereinafter described, for opening the throat between the feed rolls and platen when the platen is moved to its intermediate position, to thereby permit one work sheet W to be removed and a new one inserted. After this has been done the operator enters the next item on the amount keys and gives the machine a cycle of operation. When the machine operates the cam 93 (Fig. 1) rocks the bell crank 87—89 counterclockwise and moves the slide 84 downward to return the throw-back mechanism to normal, thus releasing the bail 80 and permitting the platen P to automatically move to printing position. The parts are timed so that this occurs during the forward stroke of the calculating machine and before the printing mechanism operates so that the papers are gripped about the platen and the platen is in printing position prior to the time that the printing hammers are fired and before any tabulating movement of the carriage occurs. The operation takes place entirely automatically and without any attention on the part of the operator.

In addition to moving the platen to its partial throw-back position, the present embodiment of the invention provides for simultaneously moving the pressure rolls away from the platen to quickly open the front-feed throat between the rolls and the platen. For convenience, this will be called the "intermediate" or "partial-open" throat position. The advantage of doing this is that a smaller movement of the platen will suffice to free the work sheets when the pressure rolls are moved than would be the case if the pressure rolls were allowed to remain stationary while the platen alone was moved. The construction for moving the pressure rolls away from the platen is as follows:

As shown in Figs. 2 and 5, the paper carriage supports a bail 160 pivoted on arms 161, one of which is shown in Fig. 2, the bail being urged clockwise as viewed in Fig. 2 by a spring 162. The movement of the bail in clockwise direction is normally limited by a stud 163 on a part 164 (Fig. 6). These parts are used on a Burroughs machine in connection with the skip tabulating mechanism described in Rinsche Patent No. 1,580,534.

Mounted on the bail 160 which travels with the paper carriage is an adjustable slide 165 (Fig. 5) positioned so that, at the time the upper stud 111 releases the latch 100, the slide 165 engages the stud 163 with the result that the bail 160 is cammed upwardly. This bail has an extension 166 at its right-hand end as shown in Fig. 5 positioned under a vertically movable slide member 167 best shown in Fig. 4. When the bail 160 is moved upwardly the slide 167 is also moved upward and a lateral lug 168 on the upper end of the slide moves into the path of a stud 169 on the upper end of the right hand arm 36 (Fig. 5) attached to the pressure roll shaft 34. This occurs before the platen moves away from printing position. As the platen moves from printing position, the shaft 34 moves with it but, because the arm 36 is blocked by stud 169 engaging lug 168, shaft 34 is caused to turn counterclockwise which moves the pressure rolls 32 away from the platen.

When the platen moves back to printing position the pressure rolls are, of course, released and the slide 167 moves back to normal as soon as the cam slide 165 passes the stud 163.

If it should be desired, in some columnar position of the carriage, to move the platen to "partial throw-back" position without releasing the pressure rolls, another stud 111 can be used without using a slide 165 in which event the work

sheet will remain clamped to the platen by the pressure rolls when the platen is moved out of printing position.

It will be clear that the studs 111 which control the automatic movement of the front-feed throat to "intermediate-open" position operate during a tabulating movement of the paper carriage. The carriage tabulates during the latter half of a given cycle of operation of the machine and hence, at the end of a cycle of operation when a stud 111 has been active, the throat stands open. During the beginning of the next cycle of machine operation the throat is automatically closed as heretofore explained. In other words, the front-feed throat is automatically opened during one cycle of machine operation and then automatically closed during the succeeding cycle.

But it is to be noted also, that the front-feed throat can be both automatically closed and automatically opened during a single cycle of machine operation. For example, referring to Fig. 6 it will be observed that a stud 110 is positioned on the bail 30 not far from the stud 111. When the carriage tabulates, the bail moves in the direction of the arrow. Assume that, during a given cycle of machine operation, the carriage tabulates from one column to the other during which tabulating movement the stud 111 becomes active to cause the front-feed throat to be moved to its "intermediate-open" position. At the start of the next cycle of operation the throat is therefore open. During the initial part of this cycle, the front-feed throat is automatically closed, the printing mechanism then operates, and, during the latter part of this same cycle, the carriage tabulates to the next column. But, during this last tabulating movement, the stud 110 becomes active to cause the front-feed throat to be moved to its "fully-open" position. Accordingly, considering this second cycle of machine operation, the front-feed throat is first automatically closed and then automatically opened during said cycle. It is obvious, of course, that instead of employing a stud 110 to open the front-feed throat to fully open position a stud 111 could be used to move it to partially open position, if such action is desired.

Safety interlocks

In order to warn the operator and prevent him from operating the machine when the platen is in its "full throw back" position, a lock has been provided for preventing depression of the motor bar 11. The details of the motor bar and the disabling connections are shown and described in my co-pending application, Serial No. 373,170 now Patent No. 1,814,178, and of which the present application is a continuation-in-part.

The paper chute 28 controls the disabling of the machine. When the platen is in printing position, the chute 28 occupies an inclined position shown in full lines in Fig. 1. As the platen is moved to its "full throw-back" position, the paper chute moves toward the inclined part of the casing of the machine. When this occurs, the chute engages a member 170 and rocks it inward thereby operating the mechanism that locks the motor bar. Accordingly, when the platen is in its "full throw-back" position the motor bar cannot be depressed.

When the platen is moved only to its "partial throw-back" position it is not desired to lock the motor bar because the return of the platen is under the control of the machine and it occurs during the succeeding machine operation and prior to operation of the printing mechanism. This is nicely taken care of by proportioning the parts so that the paper chute 28 does not push the member 170 inward when the platen is in its "partial throw-back" position. Instead, it leaves the member in substantially the full line position illustrated in Fig. 1 where the motor bar is free to be manipulated to cause the machine to operate.

The term "front-feed means" as used herein is a broad term including all types of front feeds, whether or not they have platen throwbacks associated with them and irrespective of whether the front-feed throat is formed by pressure rolls and a platen or by separate sets of pressure rolls. It also includes such devices as sheet-engaging means that engages the sheet above the printing line. Also, it is understood that, while the platen is described as being moved to front-feed position to facilitate the removal and insertion of work sheets, it also can be moved to one of its front-feed positions with the throat closed.

It is to be understood that the construction shown is for purposes of illustration only and that variations may be made in it without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. A front-feed calculating machine of the class described having a printing mechanism, a traveling paper carriage supporting a platen which is normally in printing position relative to said printing mechanism but movable away therefrom to a front-feed position to facilitate the removal and insertion of work sheets, a bail extending substantially the width of said carriage and operatively connected with said platen to move it to front-feed position, an operating means capable of being operatively connected to said bail in various positions of said carriage and being movable by power derived independently of the power of travel of said carriage, means controlling said operating means, means for releasably latching said platen in front-feed position when it is moved to said position, said operating means having portions moving automatically at substantially the time the platen reaches its front-feed position to free said bail to thereby enable the platen to be returned to printing position without interference from said operating means, and means for releasing said latching means to enable said platen to be returned to printing position.

2. A front-feed calculating machine of the class described having a printing mechanism, a platen normally in printing position relative to said printing mechanism but movable away therefrom to either of two out-of-printing positions, a bail operatively connected with said platen to move it away from printing position, an operating means for said bail having portions capable of being operatively connected to said bail to move the platen to its out-of-printing positions, means for selectively controlling said operating means to cause it to move said platen to the selected one of said platen positions, said operating means having portions moving automatically at substantially the time said platen reaches one of its out-of-printing positions but remaining unmoved when said platen reaches its other position, whereby, in one case, the bail is freed to enable the platen to return to printing position without interference from said operating means and, in the other case, the platen remains under the control of said operating means.

3. A front-feed machine of the class described having a platen normally in printing position relative to a printing mechanism but movable away therefrom to a front-feed position, a bail operatively connected with said platen to move the latter away from printing position, a slide having a pivoted arm on its end positioned to engage said bail, said arm being urged away from bail-engaging position but being normally restrained against such movement by a latch on said slide, means for moving said slide, and means for releasing said latch automatically after said slide has moved said bail to move the platen away from printing position a predetermined amount.

4. A front-feed calculating machine of the class described having a traveling paper carriage supporting a platen, front-feed means on said carriage for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means being movable from a closed to an open-throat condition and vice versa, a bail on said carriage operatively connected to said front-feed means to move the same to open-throat condition, an operating means capable of being operatively connected to said bail in various positions of said carriage, said operating means being movable by power derived independently of the power of travel of said carriage, means for latching said front-feed means in open-throat condition when it is moved to such condition, said operating means having portions moving automatically at substantially the time said front-feed means reaches open-throat condition to free said bail to thereby enable said front-feed means to be returned to closed-throat condition without interference from said operating means, and means for releasing said latching means to enable said front-feed means to be returned to closed-throat condition.

5. In a front-feed machine of the class described, a platen, pressure rolls cooperating with said platen to form a front-feed throat for receiving work sheets, said platen and pressure rolls being mounted to enable a relative movement to occur between them to open and close said front-feed throat, a bail operatively connected with the movable one of said elements to move it to open-throat position, moving means having a pivoted arm positioned to engage said bail to move it, said arm being urged away from bail-engaging position but being normally restrained against such movement, and means for releasing said arm automatically after said moving means has moved said bail to open said throat whereby said bail is free to return to normal without interference from said moving means.

6. A front-feed calculating machine of the class described having a traveling paper carriage supporting a platen, front-feed means on said carriage for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means being movable from a closed to an open-throat condition and vice versa, a bail on said carriage operatively connected to said front-feed means to move it to front-feed condition, an operating means capable of being operatively connected to said bail to operate it in various positions of said carriage, means for selectively controlling said operating means to enable it to move to two different positions in both of which said front-feed means is moved to open-throat condition, said operating means having portions moving automatically at substantially the time said operating means reaches one of its positions, but remaining unmoved when said operating means reaches its other position, whereby, in one case, said bail is freed to enable said front-feed means to be returned to closed-throat condition independently of said operating means, and, in the other case, said front-feed means remains under the control of said operating means.

7. A front-feed calculating machine of the class described having printing mechanism, a platen normally in printing position relative to said printing mechanism but movable away therefrom to a front-feed position, front-feed means for enabling a work sheet to be front-fed relative to said platen and for holding said sheet in front-fed position, said front-feed means being movable from a closed to an open-throat condition and vice versa but being closed while said platen is in printing position, platen-moving means operable to move said platen to front-feed position, means capable of operating automatically to cause said front-feed means to be moved to open-throat condition as said platen is moved to front-feed position, and means for selectively controlling said automatic throat-opening means to determine whether said front-feed means shall be automatically moved to open-throat condition or shall remain in closed-throat condition when said platen is moved to front-feed position.

8. A machine of the class described having a printing mechanism, a platen normally in printing position relative to said printing mechanism but movable away therefrom to two different out-of-printing positions, front-feed means for enabling a work sheet to be front-fed relative to said platen and for holding said sheet in front-fed position, said front-feed means being movable from closed to open-throat condition and vice versa, and means operable to move said platen to one of its out-of-printing positions while said front-feed throat remains closed and to move said platen to its other out-of-printing position and to open said front-feed throat.

9. In a front-feed machine of the class described, a printing mechanism, a platen movable to and from printing position relative to said printing mechanism, pressure rolls movable with said platen as it moves to and from printing position and adapted to cooperate with said platen to form a front-feed throat for receiving work sheets, said platen and pressure rolls being mounted to enable a relative movement to occur between them to open and close said front-feed throat, means operable to move said platen to an intermediate position away from printing position and to a fully moved position away from printing position, means acting automatically to cause a relative movement between said platen and pressure rolls to open said throat in either of the moved positions of said platen, means for holding said platen in either of its moved positions, and means for closing said throat as the platen is returned to printing position from either of its positions.

10. A front-feed bookkeeping machine of the class described having a front-strike printing mechanism, a traveling paper carriage, a platen on said carriage having a printing line, means for holding a record sheet about said platen, a front-feed paper chute movably mounted on said carriage, said chute being movable from a forward sheet-receiving position where it is spaced from said platen to a rear sheet-holding position adjacent said platen, said chute serving, when in sheet-receiving position, to form a guide en-

abling a work sheet to be freely and easily fed past said printing mechanism in any columnar position of said carriage to a front-fed position relative to said platen, sheet-engaging means associated with said chute and movable simultaneously therewith to engage an inserted work sheet above said printing line, and means for moving said chute from sheet-receiving to sheet-holding position and to move said sheet-engaging means into engagement with an inserted work sheet above the printing line to move said sheet about said platen and to hold it in printing and feeding relation thereto.

11. A front-feed calculating machine of the class described having a printing mechanism, a platen normally occupying a printing position relative to said printing mechanism but movable away therefrom to a front-feed position to facilitate the removal and insertion of work sheets, a front-feed paper chute mounted so as to be movable from a forward sheet-receiving position where it is spaced from said platen to a rear sheet-holding position adjacent said platen, said chute serving, when in sheet-receiving position, to form a guide enabling said work sheet to be freely and easily inserted to a front-feed position relative to said platen in any columnar position of the carriage, said paper chute having sheet-engaging means associated with it and movable simultaneously with it to engage the inserted work sheet above the printing line, means for moving said platen to front-feed position, and means operated by said platen as it moves to printing position for causing said paper chute to move to sheet-holding position.

12. A front-feed bookkeeping machine of the class described having a front-strike printing mechanism, a traveling paper carriage, a platen on said carriage having a printing line, means for holding a record sheet about said platen, lower sheet-engaging means positioned below said printing line and forming one element of a front-feed throat, said sheet-engaging means being movable toward and from said platen, a front-feed paper chute on said paper carriage, said chute being movable from a forward sheet-receiving position where it is spaced from said platen rearwardly to a sheet-holding position adjacent said platen, said chute serving, when in sheet-receiving position, to form a guide enabling a work sheet to be freely and easily fed past said printing mechanism in any columnar position of said carriage to a front-fed position relative to said platen, upper sheet-engaging means associated with said chute and movable simultaneously therewith to engage an inserted work sheet above said printing line, and means for moving said lower sheet-engaging means to engage the work sheet below said printing line and to simultaneously move said chute from sheet-receiving to sheet-holding position and said upper sheet-engaging means into engagement with said work sheet above the platen printing line, to thereby hold said work sheet in printing and feeding relation to said platen.

13. A front-feed bookkeeping machine of the class described having a calculating mechanism, a front-strike printing mechanism, a traveling paper carriage having a platen, means for holding a record sheet about said platen, front-feed means on said carriage for enabling a work sheet to be front-fed relative to said platen and for holding said sheet in front-fed position, said front-feed means being movable from a closed to an open-throat condition and vice versa, a front-feed paper chute movably mounted on said carriage in front of said platen and independent thereof, said chute being mounted so that it is movable from a forward, sheet-receiving position spaced from said platen rearwardly to a sheet-holding position adjacent said platen, said chute serving, when in sheet-receiving position, to form a guide enabling a work sheet to be freely and easily fed past said printing mechanism in any columnar position of said carriage to a front-feed position relative to said platen and acting, as said chute is moved rearwardly, to move the unfed end of an inserted work sheet about said platen, and means operable to move said front-feed means from open to closed-throat condition and said front-feed paper chute from sheet-receiving to sheet-holding position.

14. A front-feed machine of the class described having a platen provided with a printing line, printing mechanism, means for holding a record sheet about said platen, front-feed means for enabling a work sheet to be front fed relative to said platen and for holding said sheet in front-fed position, said front-feed means being movable from closed to open throat condition and vice versa, means for moving said front-feed means to open throat condition, a pivoted front-feed paper chute for receiving and guiding work sheets into said front-feed throat in an inclined position while said throat is open, said chute being movable from a work-sheet-receiving to a work-sheet-holding position and vice versa, and means for closing said throat and moving said front-feed chute rearwardly to work-sheet-holding position, said chute having a bottom edge which acts, as said chute is moved rearwardly, to move the unfed end of the inserted work-sheet rearwardly to hold said sheet about said platen in feeding relation thereto.

15. In a front-feed machine of the class described, a printing mechanism, a platen movable from printing position relative to said printing mechanism to a front-feed position and vice versa, means for holding a record sheet about said platen in feeding relation thereto, front-feed means for enabling a work sheet to be front-fed relative to said platen and for holding said sheet in front-fed position, said front-feed means being movable from a closed to an open-throat condition and vice versa, means for moving said platen from printing to front-feed position and said front-feed means to open-throat condition, a pivoted paper chute in front of said platen, said paper chute being movable from a work-sheet-receiving to a work-sheet-holding position and vice versa, and means for moving said platen to printing position, for closing said throat, and for moving said chute to work-sheet-holding position, said chute having portions cooperating with said platen to move the unfed end of the inserted work sheet to and hold it about said platen as said platen moves to printing position.

16. In a front-feed machine of the character described, the combination of a record material supporting means including a movable platen, means to move said platen from a working to a front-feed position to facilitate the removal and insertion of record material, means to operate said moving means, normally ineffective means for operably connecting said moving means to said operating means, a control device movable to various positions in connection with the conditioning of the machine for different functions, and means cooperating with said control device

and effective when it is in certain positions for rendering said connecting means effective.

17. A front-feed calculating machine of the class described having means for giving it cycles of operation, a printing mechanism, a platen normally occupying a printing position relative to said printing mechanism but movable away therefrom to a front-feed position to facilitate removal and insertion of work sheets, columnar-printing control means including a device movable during a machine cycle for controlling the columnar-printing condition of said control means, normally ineffective platen-moving means operable by power derived from said cycling means independently of the power of movement of said movable device for moving said platen to front-feed position, and means for conditioning said platen-moving means to enable it to operate to move said platen to front-feed position while said movable device remains stationary.

18. A front-feed calculating machine of the class described having a general operating mechanism for the calculating mechanism of the machine and means for giving said general operating mechanism and said machine cycles of operation, a printing mechanism, a platen normally occupying a printing position relative to said printing mechanism but movable away therefrom to a front-feed position, columnar printing control means including a device movable during a machine cycle for controlling the columnar-printing condition of said control means, normally ineffective platen-moving means operated by power derived from said cycling means during a cycle of said general operating mechanism and independently of the power of movement of said movable device for moving said platen to front-feed position, and control means for conditioning said platen-moving means to enable it to operate during selected cycles of machine operation.

19. In a front-feed machine of the class described having power-driven main operating means for the calculating mechanism of the machine operable through cycles of operation, the combination of a rockable platen adapted to be moved from working to open-throat position for the insertion and removal of record material, normally ineffective platen rocking means conditioned by said main operating means during a cycle of operation of said main operating means for rocking said platen to open-throat position, a device for controlling the nature of the operations performed by said machine, and means under the control of said device for rendering said rocking means effective to cause the throat to be opened.

20. A front-feed calculating machine of the class described having a general operating mechanism for the calculating mechanism of the machine, printing mechanism, means for giving said general operating mechanism cycles of operation, a platen normally occupying a printing position relative to said printing mechanism but movable to a front-feed position to facilitate the removal and insertion of work sheets, power operated platen-moving means for moving said platen to front-feed position, control means for determining when said platen-moving means shall operate, and means operated by said cycling means during a cycle of operation of said general operating mechanism for conditioning said platen-moving means for operation under the control of said control means.

21. A front-feed calculating machine of the class described having a printing mechanism, motor driving means for operating said machine, a platen normally occupying a printing position relative to said printing mechanism but movable to a front-feed position to facilitate removal and insertion of work sheets, platen-moving means for moving said platen to front-feed position, means operating during the first half of a machine cycle to store power from said motor driving means for operating said platen-moving means, and means variable as to its time of operation for controlling the release of said stored power whereby said platen-moving means may be caused to operate at different times during the second half of said machine cycle or after said cycle has ended.

22. A front-feed calculating machine of the class described having a motor driving means for giving it cycles of operation, printing mechanism, a platen normally occupying a printing position relative to said printing mechanism but movable away therefrom to front-feed position to facilitate the removal and insertion of work sheets, spring mechanism for moving said platen to said front-feed position, means operated by said motor driving means during the first half of a machine cycle for cocking said spring mechanism, and means variable as to its time of operation for releasing said spring mechanism.

23. A front-feed calculating machine of the class described having a motor driving means for giving it cycles of operation, a printing mechanism, a traveling paper carriage supporting a platen normally occupying a printing position relative to said printing mechanism but movable away therefrom to a front-feed position to facilitate removal and insertion of work sheets, normally inactive platen-moving means operable by power derived from said motor driving means independently of carriage travel for moving said platen to front-feed position, and means for conditioning said platen-moving means to cause it to operate to move said platen to front-feed position while said machine remains uncycled.

24. A front-feed machine of the class described having a platen normally in printing position relative to a printing mechanism but movable away therefrom to different positions, and means operably connected with said platen to automatically move said platen to different positions away from printing position, during predetermined operations of said machine, said means having portions acting in one position of the platen to hold said platen in the position to which it is moved and in another position to automatically disable the effective connection between said means and platen to free said platen with respect to said platen moving means.

25. A front-feed machine of the class described having a printing mechanism, a platen urged to its normal printing position relative to said printing mechanism but movable away therefrom to an intermediate and to a full throwback position, power means acting automatically during predetermined operations of the machine to selectively move said platen to its different throwback positions with provisions for holding said platen in each of the throwback positions to which it is moved, and means for moving said platen to printing position from each of said throwback positions.

26. A front-feed machine of the class described having a printing mechanism, a platen urged to its normal printing position relative to said printing mechanism but movable away therefrom to an intermediate and to a full throwback posi-

tion, power means acting automatically during predetermined machine operations to selectively move said platen to its different throwback positions, said power means having portions acting to hold said platen in its intermediate position, a latching device for holding said platen in its full throwback position, and means for releasing said latching device.

27. A front-feed machine of the class described having a printing mechanism, a platen urged to its normal printing position relative to said printing mechanism but movable away therefrom to an intermediate and to a full throwback position, power means acting automatically during predetermined machine operations to selectively move said platen to its different throwback positions, said power means including portions acting to hold said platen in its intermediate position when the platen is moved to such position and acting automatically to disable the connection between said power means and said platen when the latter is moved to its full throwback position, a latching device for holding the platen in its full throwback position, and means for releasing said latching device.

28. A machine of the class described having a printing mechanism, a platen normally in printing position relative to said printing mechanism but movable away therefrom to different out-of-printing positions, power means operable to move said platen from its printing to its out-of-printing positions, a latching device normally restraining said means, and means for variably releasing said latching device to thereby control said platen moving means to enable it to selectively move said platen to its different out-of-printing positions.

29. A front-feed calculating machine of the class described having a platen, front-feed means for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means being movable from a closed to an open-throat condition and vice versa, means to move said front-feed means to open-throat condition, means to operate said moving means, normally ineffective means for operably connecting said moving means to said operating means, a control device movable to various positions in connection with the conditioning of the machine for different functions, and means cooperating with said control device and effective when it is in certain positions for rendering said connecting means effective.

30. In a front-feed machine of the class described, a printing mechanism, means for holding a record sheet in printing position relative to said printing mechanism, front-feed means for receiving and holding a front-fed work sheet in printing position relative to said printing mechanism, said front-feed means being movable from closed to open-throat condition and vice versa, power means operable to move said front-feed means to open-throat condition, a latching device normally restraining said power means, means for releasing said latching device to free said power means to enable it to open said throat, means for guiding a work sheet into said open-throat from the front, and mechanism operating automatically during a machine operation to return said power means to normal latched condition.

31. In a front-feed machine of the class described, a platen, means for holding a record sheet about said platen in feeding relation thereto, pressure rolls cooperating with said platen to form a front-feed throat to receive work sheets, said platen being movable away from said pressure rolls to an open-throat position, power means operable to move said platen to open-throat position, a latching device normally restraining said power means, means for releasing said latching device to free said platen moving means to enable it to move the platen to open-throat position, means for latching said platen in open-throat position, means for guiding a work sheet under said platen from the front while it is in open-throat position, means for releasing said latching means, and mechanism operating automatically during a machine operation to return said platen moving means to normal latched position.

32. In a front-feed machine of the class described, a traveling paper carriage, a printing mechanism, means for holding a record sheet in printing position relative to said printing mechanism, a platen, front-feed means for enabling a work sheet to be front fed relative to said platen and for holding said sheet in front-fed position, said front-feed means being movable from closed to open-throat condition and vice versa, power means operably connected to said front-feed means and operating by power derived independently of travel of said carriage to move said front-feed means to open-throat condition, a latching device for holding said front-feed means in open-throat condition, said moving means including portions acting, after said front-feed means has been moved to open-throat condition, to automatically condition the connection between said moving means and said front-feed means to enable said front-feed means to return to closed-throat condition without interference from said moving means, and means for releasing said latching device.

33. In a front-feed machine of the class described, a traveling paper carriage, a platen, means for holding a record sheet about said platen in feeding relation thereto, pressure rolls cooperating with said platen to form a front-feed throat for receiving work sheets, said platen and pressure rolls being mounted to enable a relative movement to occur between them to open and close said front-feed throat, power means operably connected to the movable one of said elements for moving it to open said throat, said power means being operable by power derived independently of travel of said carriage, a latching device for holding said moved element in open-throat position, and means for releasing said latching device, said throat opening means including portions acting automatically to disable its operative connection with said movable element after said element has been moved to open-throat position whereby, when said latching device is released, said moved element may return to closed-throat position without interference from said throat opening means.

34. A front-feed calculating machine of the class described having means for giving it cycles of operation, a traveling carriage, a platen, front-feed means for receiving and holding a work sheet in front-fed position, said front-feed means being movable from closed to open-throat condition and vice versa, columnar-printing control means including a device movable during a machine cycle to control the columnar-printing condition of said control means, normally ineffective throat-opening means operable by power derived from said cycling means independently of the power of movement of said movable device for

moving said front-feed means to open-throat condition, and means for conditioning said throat-opening means to enable it to operate to move the front-feed means to open-throat condition while said movable device remains stationary.

35. A front-feed calculating machine of the class described having a general operating mechanism for the calculating mechanism of the machine and means for giving said general operating mechanism cycles of operation, a platen, front-feed means for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means being movable from a closed to an open-throat condition and vice versa, columnar-printing control means including a device movable during a machine cycle to control the columnar-printing condition of said control means, normally ineffective throat-opening means operated by power derived from said cycling means during a cycle of operation of said general operating mechanism and independently of the power of movement of said movable device, and control means for conditioning said throat-opening means to enable it to operate during selected cycles of machine operation.

36. A front-feed calculating machine of the class described having a general operating mechanism for the calculating mechanism of the machine and motor driving means for giving said general operating mechanism cycles of operation, a platen, front-feed means for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means being movable from closed to open-throat condition and vice versa, normally ineffective throat-opening means conditioned by said motor driving means during a cycle of operation of said general operating mechanism, a device for controlling the nature of the operations performed by said machine, and means under the control of said device for rendering said throat-opening means effective to move the front-feed means to open-throat condition.

37. In a front-feed machine of the character described having a front-feed means provided with a portion movable from a normal to a more accessible position to permit ready removal and insertion of record material, the combination of a power-driven main operating mechanism for said machine, a member adapted to be given a definite movement by said main operating mechanism during a cycle of operation of said machine, a contrivance operably connected to said front-feed means and yieldingly urged into engagement with the member, means to hold said contrivance out of engagement with said member, a device for controlling the nature of the operations performed by said machine, and means controlled by said device for rendering said holding means ineffective to thereby permit said contrivance to engage said member to enable it to be conditioned so as to move the movable portion of said front-feed means to a more accessible position.

38. A front-feed calculating machine of the class described having a general operating mechanism for the calculating mechanism of the machine and means for giving said general operating mechanism cycles of operation, a platen, front-feed means for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means being movable from a closed to an open-throat condition and vice versa, throat-opening means for moving said front-feed means to open-throat condition, control means for determining when said throat-opening means shall operate, and means operated by said cycling means during a cycle of operation of said general operating mechanism for conditioning said throat-opening means for operation under the control of said control means.

39. A front-feed calculating machine of the class described having a motor driving means for giving it cycles of operation, a platen, front-feed means for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means being movable from closed to open-throat condition and vice versa, throat-opening means for moving said front-feed means to open-throat condition, means operating during the first half of a machine cycle to store power from said motor driving means for operating said throat-opening means, and means for controlling the time when said stored power shall be applied to open said front-feed throat whereby said throat-opening means may be caused to operate at different times during the second half of the machine cycle or after said cycle has ended.

40. A front-feed calculating machine of the class described having a motor driving means for giving it cycles of operation, a platen, front-feed means for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means being movable from a closed to an open-throat condition and vice versa, spring mechanism for moving said front-feed means to open-throat condition, means operated by said motor driving means during the first half of a machine cycle for cocking said spring mechanism, and means variable as to its time of operation for releasing said spring mechanism to cause it to move said front-feed means to open-throat condition.

41. A front-feed calculating machine of the class described having a motor driving means for giving it cycles of operation, a platen, front-feed means for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means being movable from a closed to an open-throat condition and vice versa, normally ineffective throat-opening means conditioned by power derived from said motor driving means during a machine cycle for moving said front-feed means to open-throat condition, and means for rendering said throat-opening means effective to move said front-feed means to open-throat condition while said machine is in a non-cycling condition.

42. A machine of the class described having a motor driving means for giving it cycles of operation, a printing mechanism, a traveling paper carriage, a platen movable from a printing position relative to said printing mechanism to a front-feed position and vice versa but being urged to printing position, front-feed means for enabling a work sheet to be front fed relative to said platen and for holding said sheet in front-fed position, said front-feed means being movable from closed to open-throat condition and vice versa, and power means operating during a cycle of operation of said machine by power derived independently of travel of said carriage for moving said platen to front-feed position and opening said throat, latching means for holding said platen and front-feed means in the position to which they are moved, said platen moving means having portions acting automatically to disable the effective connection between itself and said platen after the platen has been moved to front-

feed position to thereby free the platen with respect to the moving means, and manually operable means for releasing said latching means to free the platen for return to printing position.

43. A front-feed calculating machine of the class described having a motor driving means for giving said machine cycles of operation, a printing mechanism, a platen normally occupying a printing position relative to said printing mechanism but movable away therefrom to front-feed position, front-feed means for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means being movable from a closed to an open-throat condition and vice versa, platen-moving means operable by power derived from said motor driving means for moving said platen to front-feed position and automatically to move said front-feed means to open-throat condition, and means controlling said platen-moving means for conditioning it to enable it to move said platen to front-feed position with said front-feed means remaining in closed-throat condition and without causing a cycle of machine operation.

44. A front-feed calculating machine of the class described having a motor driving means for giving said machine cycles of operation, a printing mechanism, a traveling carriage supporting a platen normally occupying a printing position relative to said printing mechanism but movable away therefrom to a front-feed position, sheet-engaging devices movable bodily with said platen as it moves to and from printing position and adapted to cooperate with said platen to form a front-feed throat for receiving work sheets, said platen and sheet-engaging devices being mounted to enable a relative movement to occur between them to open and close said front-feed throat, platen-moving means operable by power derived from said motor driving means independently of carriage travel for moving said platen to front-feed position and automatically to cause a relative movement between said platen and sheet-engaging devices to open said throat, and means associated with said platen-moving means for conditioning it to enable it to move said platen to front-feed position while said sheet-engaging devices and platen remain in closed-throat position.

45. A front-feed machine of the class described having a printing mechanism, a traveling paper carriage provided with a platen, means for holding a record sheet about said platen, a front-feed paper chute for guiding a work sheet bottom end first into front-fed position relative to said platen, said paper chute being movable from a work-sheet-receiving position to a printing position and vice versa, and power means operable by power derived independently of travel of said carriage for moving said chute from printing to sheet-receiving position in a predetermined position of said carriage.

46. A front-feed machine of the class described having a printing mechanism, a traveling paper carriage provided with a platen, means for holding a record sheet about said platen, a front-feed paper chute for receiving and guiding a work sheet bottom end first into front-fed position relative to said platen, said chute being movable from a work-sheet-receiving to a sheet-holding position and vice versa, sheet-engaging means for engaging an inserted work sheet to hold it in printing position during a printing operation of said printing mechanism, said sheet-engaging means being movable from a sheet-engaging to a sheet-releasing position and vice versa, means operable to move said chute from sheet-receiving to sheet-holding position and to move said sheet-engaging means to engaging position, and power means operable by power derived independently of carriage travel for moving said chute from sheet-holding to sheet-receiving position and sheet-engaging means to sheet-releasing position in a predetermined position of said carriage.

47. A front-feed calculating machine of the class described having means for giving it cycles of operation, printing mechanism, a platen having a printing line, a front-feed paper chute for receiving and guiding a work sheet bottom end first into front-fed position relative to said platen, said chute being movable from a sheet-receiving to a sheet-holding position and vice versa and having devices associated with it for engaging a front-fed work sheet above the printing line of said platen, sheet-engaging means for engaging a front-fed work sheet below the printing line of said platen, said sheet-engaging means being movable from a sheet-engaging to a sheet-releasing position and vice versa, means operable to move said chute from sheet-receiving to sheet-holding position and to move said sheet-engaging means to engaging position, columnar-printing control means including a device movable to effect changes in columnar printing, power means operating by power derived from said cycling means independently of the power of movement of said movable device for moving said chute from sheet-holding to sheet-receiving position and said sheet-engaging means to sheet-releasing position, and means for selectively controlling said power operated means.

48. In a machine of the class described, the combination of a shiftable traveling carriage; a rockable platen carrying frame supported thereby; means controlling the columnar positioning of said carriage; and means rendered effective by the carriage and functioning after the carriage is moved to a predetermined columnar position for rocking the platen carrying frame into a more accessible position to facilitate the insertion and removal of material therein.

49. A machine of the class described having a printing mechanism, a traveling paper carriage supporting a platen, said platen being mounted on said carriage so as to be movable from its normal printing position relative to said printing mechanism to an out-of-printing position and vice versa, power means operable in each of the columnar positions of the carriage by power derived independently of traveling movement of said carriage to move said platen to its out-of-printing position, said power means being normally in ineffective condition, and means controlled by said carriage operating automatically to render said power means effective in a predetermined columnar position of said carriage.

50. A front-feed calculating machine of the class described having a power driving means for giving it cycles of operation, a printing mechanism, a traveling paper carriage supporting a platen normally in printing position relative to said printing mechanism but movable away therefrom to a front-feed position to facilitate the removal and insertion of work sheets, platen-moving means for moving said platen from printing to front-feed position, means operated during the first half of a machine cycle for storing power from said motor driving means for operation of said platen-moving means, and means governed by said paper carriage adjustable as to time

of operation for controlling the time during the second half of said machine cycle when said stored power shall be applied to operating said platen-moving means.

51. A front-feed calculating machine of the class described having a general operating mechanism for the calculating mechanism of the machine and means for giving said general operating mechanism cycles of operation, a printing mechanism, a platen normally occupying a printing position relative to said printing mechanism but movable away therefrom to a front-feed position to facilitate the removal and insertion of work sheets, power operated means for moving said platen to front-feed position, columnar-printing control means including a device movable during a cycle of said general operating mechanism for controlling the columnar-printing condition of said control means, and means controlled by said movable device and by a member that is moved by said cycling means during a cycle of operation of said general operating mechanism for determining the time when said power means shall operate to move said platen to front-feed position.

52. A machine of the class described having a printing mechanism, a traveling paper carriage, a platen normally in printing position relative to said printing mechanism but movable away therefrom to different out-of-printing positions, power means operable to move said platen from its printing to its out-of-printing positions, a latching device normally restraining said means, and means controlled by said carriage for variably releasing said latching device to thereby control said platen moving means to enable it to automatically and selectively move said platen to its different out-of-printing positions.

53. A machine of the class described having a printing mechanism, a traveling paper carriage, a platen normally in printing position relative to said printing mechanism but movable to an out-of-printing position, a bail operably connected to said platen to move it, a power operated means adapted to operate said bail in the various positions of said carriage, a restraining device normally holding said power means ineffective, and means automatically operating to release said restraining device in a predetermined position of said carriage.

54. A machine of the class described having a motor for driving the same, a printing mechanism, a traveling paper carriage, a platen normally in printing position relative to said printing mechanism but movable to an out-of-printing position, spring actuated means operable to move said platen to its out-of-printing position, a latching device normally restraining said spring actuated means, means controlled by said paper carriage for releasing said latching device to free said spring-actuated means to enable it to move the platen away from printing position, and means operated directly by said motor acting to restore and retension said spring actuated means.

55. In a front-feed machine of the class described, a traveling paper carriage, a platen, a printing mechanism, front-feed means for enabling a work sheet to be front-fed relative to said platen and for holding said sheet in front-fed position, said front-feed means being movable from closed to open-throat condition and vice versa, a movable bail traveling with said carriage and having connections operable to move said front-feed means to open-throat position, power means adapted to move said bail in various positions of said carriage, and means controlled automatically to cause said power means to operate, in a predetermined position of said carriage to thereby move said bail to open said front-feed throat.

56. A front-feed bookkeeping machine of the class described having a printing mechanism, a platen, means for holding a record sheet in printing position relative to said printing mechanism so that it will receive a running record of all transactions, front-feed means for enabling a work sheet to be front-fed relative to said platen and for holding said sheet in front-fed position, said front-feed means being separate from said printing mechanism and being movable from a closed to an open-throat condition and vice versa but normally remaining closed after it has been closed, columnar-printing control means for conditioning said machine to cause printing to occur in different predetermined columns on said work sheet, power-operated-throat-opening means operable by power derived independently of said columnar-printing control means, said throat-opening means normally being in ineffective condition, and means automatically operating as said machine is conditioned for printing in a predetermined column, to condition said power-operated-throat-opening means for moving said front-feed means to open-throat condition.

57. A front-feed machine of the class described having a traveling paper carriage provided with a platen, a printing mechanism, means for holding a record sheet about said platen, front-feed means for enabling a work sheet to be front fed relative to said platen and for holding said sheet in front-fed position, said front-feed means being movable from closed to open-throat position and vice versa, power-operated-throat-opening means operable to move said front-feed means to open-throat condition by power derived independently of carriage travel, said power-operated-throat-opening means normally being in ineffective condition, and means operable to condition said power-operated-throat-opening means for moving said front-feed means to open-throat condition for selected positions of said carriage.

58. A front-feed machine of the class described having a printing mechanism, means for holding a record sheet in printing position relative to said printing mechanism, a traveling paper carriage, a platen, front-feed means for enabling a work sheet to be front fed relative to said platen and for holding said sheet in front-fed position, said front-feed means being movable from closed to open-throat condition and vice versa, power means operable in all the columnar positions of the carriage by power derived independently of carriage travel for moving said front-feed means to open-throat position, said power means being normally in ineffective condition, and means controlled by said carriage for rendering said power means effective.

59. A front-feed machine of the class described having a traveling paper carriage, a platen on said carriage, pressure rolls cooperating with said platen to form a front-feed throat for receiving work sheets, said platen and pressure rolls being mounted to enable a relative movement to occur between them to open and close said front-feed throat, power means operable in all the columnar positions of the carriage by power derived independently of carriage travel for causing a relative movement between said platen and pressure rolls to open said throat, said power means being normally in ineffective position, and means

controlled by said carriage for rendering said power means effective.

60. A front-feed machine of the class described having a traveling paper carriage, a platen on said carriage, a printing mechanism, front-feed means on said carriage for enabling a work sheet to be front fed relative to said platen and for holding said sheet in front-fed position, said front-feed means being movable from closed to open-throat condition and vice versa, power means tending to move said front-feed means to open-throat position, said power means being operable by power derived independently of travel of said carriage to open said throat in all the columnar positions of said carriage, restraining means normally restraining said power means against movement, and means controlled by said carriage for automatically releasing said restraining means to enable said power means to operate immediately to open said throat.

61. A front-feed machine of the class described having a motor driven operating means adapted to give said machine cycles of operation, a printing mechanism, a traveling paper carriage, means for holding a record sheet in printing position relative to said printing mechanism, a platen, front-feed means for enabling a work sheet to be front-fed relative to said platen and for holding said sheet in front-fed position, said front-feed means being movable from closed to open throat condition and vice versa, throat opening means operable by power furnished by said motor driven operating means during a cycle of operation of said machine and independently of travel of said carriage for moving said front-feed means to open throat condition, said throat-opening means being normally held in ineffective condition, and means operable automatically to condition said power operated throat-opening means for moving said front-feed means to open throat condition for a predetermined position of said carriage.

62. A front-feed machine of the class described having a power operated means for giving the machine cycles of operation, a traveling paper carriage, a platen on said carriage, means for holding a record sheet about said platen, front-feed means on said carriage for enabling a work sheet to be front fed relative to said platen and for holding said sheet in front-fed position, said front-feed means being movable from closed to open-throat condition and vice versa, a movable bail traveling with said carriage and having connections operable to move said front-feed means to open-throat condition, means operable by said power operated means adapted to engage said bail in the various columnar positions of said carriage to open said throat during a cycle of operation of said machine, and means controlled by said carriage for causing said bail moving means to operate in a predetermined columnar position of said carriage to thereby open said front-feed throat.

63. A front-feed calculating machine of the class described having a power driving means for giving it cycles of operation, a traveling paper carriage supporting a platen, front-feed means for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means being movable from a closed to an open-throat condition and vice versa, throat-opening means for moving said front-feed means to open-throat condition, means operated during the first half of a machine cycle for storing power from said motor driving means for operation of said throat-opening means, and means governed by said paper carriage adjustable as to time of operation for controlling the time during the second half of said machine cycle when said stored power shall be applied to operating said throat-opening means.

64. A front-feed calculating machine of the class described having a general operating mechanism for the calculating mechanism of the machine and means for giving said general operating mechanism cycles of operation, a platen, front-feed means for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means being movable from a closed to an open-throat condition and vice versa, power operated throat-opening means for moving said front-feed means to open-throat condition, columnar-printing control means including a device movable during a cycle of said general operating mechanism for controlling the columnar-printing condition of said control means, and means controlled by said movable device and by a member that is moved by said cycling means during a cycle of said general operating mechanism for determining the time when said throat-opening means shall operate to move said front-feed means to open-throat condition.

65. In a front-feed machine of the class described, a printing mechanism, means for holding a record sheet in printing position relative to said printing mechanism, front-feed means for receiving and holding a front-fed work sheet in printing position relative to said printing mechanism, said front-feed means being movable from a closed-throat position to an intermediate or a fully-open-throat position, mechanism acting automatically during one predetermined operation of said machine to move said front-feed means from closed-throat to intermediate open-throat position, said mechanism acting automatically during another predetermined operation to move said front-feed means from closed-throat to full-open-throat position, devices for holding said front-feed means in its open positions, means for guiding a work sheet into said open-throat from the front while said front-feed means is in either of its open positions, and means for moving said front-feed means to closed-throat position.

66. In a front-feed machine of the class described, a printing mechanism, a traveling paper carriage, means for supporting a record sheet in printing position relative to said printing mechanism, front-feed means for receiving and holding a work sheet in printing position relative to said printing mechanism, said front-feed means being movable from a closed-throat position to an intermediate or a full-open-throat position, means controlled by said carriage acting automatically in a predetermined position of said carriage to cause said front-feed means to move from closed-throat to intermediate open-throat position to enable one work sheet to be readily removed and another inserted, means for moving said front-feed means to closed-throat position, said carriage controlled means including portions operable automatically in other predetermined columnar positions of said carriage to move said front-feed means to a full-open-throat position, latching means for holding said front-feed means in full-open-throat position, and means for releasing said latching means.

67. A front-feed machine of the class described having a traveling paper carriage, a printing mechanism, means for holding a record sheet in printing position relative to said printing mechanism, front-feed means for holding a front-fed

work sheet in printing position relative to said printing mechanism, said front-feed means including two throat elements each of which is movable relative to the other to open and close said front-feed throat, means conditioned by said carriage in predetermined positions thereof for enabling said throat elements, when moved, to be automatically and simultaneously moved relative to one another to quickly open said front-feed throat in said carriage positions, and means for so moving said elements.

68. In a front-feed machine of the class described, a traveling paper carriage, a platen on said carriage, means for holding a record sheet about said platen in feeding relation thereto, pressure rolls on said carriage cooperating with said platen to form a front-feed throat for the receipt of work sheets, said platen and pressure rolls being mounted to enable a relative movement to occur between them to open and close said front-feed throat, a movable bail traveling with said carriage and connected to the movable one of said carriage elements to cause a relative movement between said platen and pressure rolls, power operated means positioned to engage said bail, a restraining device normally restraining said power operated means against effective operation, and a stop on said carriage for releasing said restraining device in a predetermined position of said carriage.

69. A front-feed machine of the class described having a printing mechanism, a traveling paper carriage, a platen movable from printing position relative to said printing mechanism to a front-feed position and vice versa, means for holding a record sheet about said platen in feeding relation thereto, front-feed means for enabling a work sheet to be front fed relative to said platen and for holding said sheet in front-fed position, said front-feed means being movable from closed to open-throat condition and vice versa, power means operable in each of the columnar positions of the carriage by power derived independently of carriage travel for moving said platen and record sheet to front-feed position and opening said front-feed throat, said power means being normally in ineffective condition, and means controlled by said carriage for rendering said power means effective in a predetermined position of said carriage.

70. A front-feed machine of the class described having a printing mechanism, a traveling paper carriage, a platen movable from a printing position relative to said printing mechanism to a front-feed position and vice versa, means for holding a record sheet about said platen, feed rolls cooperating with said platen to form a front-feed throat, said feed-rolls and platen being mounted to enable a relative movement to occur between them to open and close said front-feed throat and said feed rolls being movable with said platen as it moves from printing to front-feed position and vice versa, and power means operable by power derived independently of travel of said carriage and controlled by said paper carriage acting to automatically move said platen with said feed rolls from printing to front-feed position and to cause a relative movement between said feed rolls and platen to open said front-feed throat.

71. A front-feed machine of the class described having a motor driven operating means adapted to give said machine cycles of operation, a printing mechanism, a traveling paper carriage, a platen movable from a printing position relative to said printing mechanism to a front-feed position and vice versa, means for holding a record sheet about said platen, feed rolls cooperating with said platen to form a front-feed throat for receiving front-fed work sheets, said platen and feed rolls being mounted to enable one to move relative to the other to open and close the throat between them without disturbing said record sheet, throat opening means operable by power furnished by said motor driven operating means during a cycle of operation of said machine and independently of travel of said carriage for moving said platen from printing to front-feed position and for causing a relative movement between said platen and feed rolls to open said throat, and means controlled by said traveling paper carriage for causing said power operated throat opening means to move said platen to front-feed position and said front-feed means to open throat position.

72. A front-feed calculating machine of the class described having a printing mechanism, a traveling paper carriage supporting a platen normally occupying a printing position relative to said printing mechanism but movable away therefrom to a front-feed position, front-feed means for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means being movable from closed to open-throat condition and vice versa, power operated means for moving said platen to front-feed position and said front-feed means to open-throat condition, and means governed by said paper carriage for selectively determining whether said front-feed means shall be moved to open-throat condition or remain closed when said platen is moved to front-feed position.

73. A machine of the class described having a printing mechanism, a traveling paper carriage provided with a platen movable from printing position relative to said printing mechanism to a front-feed position and vice versa, means for moving said platen from printing to front-feed position, pressure rolls for said platen urged into feeding engagement with it and movable with it as it moves to front-feed position, and means controlled by said carriage automatically acting to separate said pressure rolls and platen as said platen is moved out of printing position.

74. A machine of the class described having a printing mechanism, a traveling paper carriage provided with a platen carried by a frame which is movable to move said platen from printing position relative to said printing mechanism to a front-feed position and vice versa, means for moving said frame to move said platen to front-feed position, pressure rolls carried by a support that is movably mounted on said platen frame, means urging said pressure rolls into feeding engagement with said platen, and an abutment moved automatically in a predetermined position of said carriage to engage the pressure roll support as the platen moves out of printing position whereby said pressure rolls are moved relative to said platen to separate them from said platen as the platen moves to front-feed position.

75. A front-feed calculating machine of the class described having means for giving it cycles of operation, a printing mechanism, a platen provided with a printing line, a front-feed paper chute pivotally mounted in front of said platen and independently thereof, said chute being movable from a forward sheet-receiving position spaced from said platen to a sheet-holding position adjacent said platen, said chute having

sheet-engaging devices connected to and movable with it for engaging the upper end of a front-fed work sheet above the printing line of said platen, lower sheet-engaging means adapted to engage a front-fed work sheet below the printing line of said platen, said lower sheet-engaging means being movable from a sheet-engaging to a sheet-releasing position and vice versa, means for simultaneously moving said paper chute and said lower sheet-engaging means to sheet-holding position, columnar-printing control means including a device movable during a machine cycle to control the columnar-printing condition of said control means, and power means governed by said movable device for moving said paper chute and said lower sheet-engaging means to sheet-receiving position.

76. A front-feed calculating machine of the class described having a traveling paper carriage, a platen on said carriage provided with a printing line, pressure rolls engaging said platen to form a front-feed throat, said pressure rolls and platen being mounted to enable a relative movement to occur between them to open and close said throat, a front-feed paper chute pivotally mounted on said carriage independently of said platen, said chute being movable from a sheet-receiving position where it is spaced from said platen to a sheet-holding position adjacent said platen, sheet-engaging devices connected to and movable with said chute to engage the unfed end of an inserted work sheet, said sheet-engaging devices acting, as said chute is moved to sheet-holding position, to move the unfed end of an inserted work sheet about said platen and to hold said sheet above said printing line, and power means conditioned by said paper carriage in a predetermined position thereof to enable said power means to cause a relative movement between said pressure rolls and platen to open said throat, to move said chute from printing to sheet-receiving position, and to move said sheet-engaging devices to sheet-releasing position.

77. A front-feed calculating machine of the class described having means for giving it cycles of operation, a platen provided with a printing line, a front-feed paper chute movable from a sheet-receiving to a sheet-holding position and vice versa, said chute having sheet-engaging devices connected to and movable with it for engaging the upper end of a front-fed work sheet above the printing line of said platen, lower sheet-engaging means adapted to engage a front-fed work sheet below the printing line of said platen, said lower sheet-engaging means being movable from a sheet-engaging to a sheet-releasing position and vice versa, means for simultaneously moving said paper chute and said lower sheet-engaging means to sheet-holding position, columnar-printing control means including a device movable during a machine cycle to control the columnar-printing condition of said control means, and means operable by power derived from said cycling means independently of the power of movement of said movable device but governed by said movable device automatically acting to move said paper chute and said lower sheet-engaging means to sheet-receiving position.

78. A front-feed machine of the class described having a printing mechanism, a traveling paper carriage provided with a platen, said carriage being tabulatable across the machine in one direction and returnable in the other direction, means for holding a record sheet about said platen, pressure rolls cooperating with said platen to form a front-feed throat, said rolls being movable relative to said platen to open and close said throat, a movable front-feed paper chute for receiving and guiding a work sheet bottom end first into front-fed position relative to said platen, said paper chute being mounted independent of said pressure rolls, means operable to move said chute from sheet-receiving to printing position and to simultaneously move said pressure rolls to closed-throat position, and power means controlled by said paper carriage acting to automatically move said chute from printing to sheet-receiving position and said pressure rolls to open-throat position in predetermined positions of said carriage.

79. A front-feed machine of the class described having a motor driven operating means adapted to give said machine cycles of operation, a printing mechanism, a traveling paper carriage, a platen on said carriage, means for holding a record sheet about said platen, front feed means on said carriage for receiving and holding a front-fed work sheet in front-fed position relative to said platen, said front-ieed means including portions forming a front-feed throat which portions are movable from closed to open throat position and vice versa, a front-feed paper chute on said carriage for guiding work sheets into said throat while it is open, throat opening means operable by power furnished by said motor driven operating means during a cycle of operation of said machine and independently of travel of said carriage for moving said front-feed means to open throat position, and means controlled by said traveling paper carriage for causing said power operated throat opening means to move said front-feed means to open throat position.

80. A front-feed machine of the class described adapted to be given cycles of operation, a printing mechanism, a traveling paper carriage, a platen movable from a printing position relative to said printing mechanism to a front-feed position and vice versa, means for holding a record sheet about said platen, front-feed means for receiving front-fed work sheets, said front-feed means being movable from closed to open-throat condition and vice versa, a movable front-feed paper chute adapted to be moved from a work-sheet-receiving to a work-sheet-holding position and vice versa, a movable bail traveling with said carriage and having connections operable to move said platen, to open said throat, and to move said paper chute, power means adapted to engage said bail in various positions of said carriage to move said bail during a cycle of operation of the machine, said power means being normally in ineffective condition, and means controlled by said carriage for causing said bail-moving means to be operated during a cycle of operation of the machine in a predetermined position of the carriage to thereby move the platen to front-feed position, to move said front-feed means to open-throat condition, and to move the paper chute from work-sheet-holding to work-sheet-receiving position.

81. A front-feed machine of the class described having a motor driven operating means adapted to give said machine cycles of operation, a printing mechanism, a traveling paper carriage, a platen movable from printing position relative to said printing mechanism to a front-feed position and vice versa, means for holding a record sheet about said platen, pressure rolls cooperating with said platen to form a front-feed throat, said pressure rolls being movable with said platen as it is moved from printing to front-feed position and

vice versa and being also movable relative to said platen, a front-feed paper chute for guiding work sheets into said throat from the front while it is open, said chute being movable from a sheet-receiving to a printing position and vice versa, throat opening means operable by power furnished by said motor driven operating means during a cycle of operation of said machine and independently of travel of said carriage, and means controlled by said paper carriage for causing said power operated throat opening means to move said platen to front-feed position, said throat to open condition, and said chute to sheet-receiving position.

82. In typewriting and accounting machines having a carriage laterally movable in opposite directions, and a paper supporting platen mounted on the carriage and movable from closed-throat to open-throat position to permit the insertion of paper and back to closed-throat position, the combination of a power means, normally ineffective connections intermediate the power means and platen, said connections, when effective, acting to move said platen from closed-throat to open-throat position; and manipulative means for rendering said connections effective independent of any movement or position of the carriage.

83. A front-feed calculating machine of the class described having a motor driving means for giving it cycles of operation, a traveling paper carriage normally moving from one column to another as an incident to machine cycles, a printing mechanism, a platen normally occupying a printing position relative to said printing mechanism but movable to a front-feed position to facilitate the removal and insertion of work sheets, platen-moving means operated by power derived from said motor driving means independently of carriage travel for moving said platen to front-feed position, said platen-moving means normally being inactive to move said platen during machine cycling operations of said motor driving means, and manipulative means operable at the option of the operator in any columnar position of said carriage to condition said power operated platen-moving means independently of said carriage to enable it to move said platen to front-feed position.

84. In a machine of the class described, the combination of record material supporting means, including a rockable platen; means to rock the platen from working position to a more accessible position for the removal and insertion of record material; means to operate the rocking means; normally ineffective means to connect the operating means to the rocking means; and means independent of the record material supporting means to render the connecting means effective to cause the platen to be rocked to its more accessible position.

85. In a machine of the character described, the combination of record material supporting means, including a rockable platen; means to rock the platen from working position to a more accessible position for the removal and insertion of record material; a main operating means for the machine; actuating means for said platen rocking means, said actuating means being operably connectible to said main operating means for the purpose of rendering said actuating means effective; a latch normally effective to restrain the actuating means; and means independent of the record material supporting means to disengage the latch.

86. In a front-feed calculating machine of the class described adapted to be given cycles of operation, the combination of a rockable platen adapted to be moved from a normal working position adjacent a printing mechanism to an open-throat position to facilitate the insertion and removal of record material, power-driven main operating means for said machine, normally ineffective platen rocking means conditioned by said main operating means during a machine cycle for rocking said platen to open-throat position, and manipulative means for rendering said rocking means effective to cause the throat to be opened.

87. In a machine of the class described, the combination of record material supporting means, including a rockable platen; means to rock the platen from working position to a more accessible position for the removal and insertion of record material; means to operate the rocking means; normally ineffective means to connect the operating means to the rocking means; means, independent of the record material supporting means, to render the connecting means effective to cause the platen to be rocked to its more accessible position; means to lock the platen in its more accessible position; and manipulative means to render the locking means ineffective and to return the platen to its working position.

88. In a machine of the character described, the combination with a traveling carriage, a rockable frame mounted in the carriage, and a platen roll supported by the rockable frame, of means to rock the frame to move the platen from printing position to open-throat position to facilitate the removal and insertion of record material around said platen; a bail running the length of the carriage and connected to the rockable frame; a finger cooperating with the bail; means to operate the finger; normally ineffective means to connect the finger to the operating means, a plurality of keys to control operation of the machine; and means whereby certain of the keys render the connecting means effective to cause the finger, in cooperation with the bail, to rock the frame to move the platen to open-throat position.

89. A front-feed calculating machine of the class described having a motor driving means for giving it cycles of operation, a printing mechanism, a traveling paper carriage supporting a platen normally occupying a printing position relative to said printing mechanism but movable away therefrom to a front-feed position to facilitate removal and insertion of work sheets, platen-moving means operable by power derived from said motor driving means independently of carriage travel for moving said platen to front-feed position, said platen-moving means normally being inactive to move said platen during machine cycling operations of said motor driving means, and manipulative means operable at the option of the operator in any columnar position of said carriage to condition said platen-moving means to enable it to move said platen to front-feed position while said carriage remains stationary.

90. A front-feed calculating machine of the class described having a motor driving means for giving it cycles of operation, a printing mechanism, a traveling paper carriage supporting a platen normally occupying a printing position relative to said printing mechanism but movable away therefrom to a front-feed position to facilitate removal and insertion of work sheets, platen-moving means operable by power derived from

said motor driving means independently of carriage travel for moving said platen to front-feed position, said platen-moving means normally being inactive to move said platen during machine cycling operations of said motor driving means, and manipulative means operable at the option of the operator in any columnar position of said carriage to condition said platen-moving means to enable it to operate to move said platen to front-feed position while said machine remains uncycled.

91. A front-feed calculating machine having a carriage laterally movable in opposite directions, a platen, front-feed means for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means being movable from closed to open-throat condition and vice versa, power throat-opening means for moving said front-feed means to open-throat condition, normally ineffective connections intermediate the power means and said front-feed means, said connections, when effective, acting to move said front-feed means from closed-throat to open-throat condition, and manipulative means for rendering said connections effective independent of any movement or position of the carriage.

92. A front-feed calculating machine of the class described having a motor driving means for giving it cycles of operation, a traveling paper carriage supporting a platen, front-feed means for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means being movable from a closed to an open-throat condition and vice versa, throat-opening means operable by power derived from said motor driving means independently of carriage travel for moving said front-feed means to open-throat condition, said throat-opening means normally being inactive to open said throat during machine cycling operations of said motor driving means, and manipulative means operable at the option of the operator, with the carriage in any of its various columnar positions, to condition said power operated throat-opening means independently of said carriage to enable it to move said front-feed means to open-throat condition.

93. A front-feed calculating machine of the class described having a general operating mechanism for the calculating mechanism of the machine and means for giving said general operating mechanism and said machine cycles of operation, a platen, front-feed means for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means being movable from a closed to an open-throat condition and vice versa, normally ineffective throat-opening means conditioned by said cycling means during a cycle of operation of said general operating mechanism for moving said front-feed means to open-throat condition, and manipulative means for rendering said throat-opening means effective to enable it to operate to cause said front-feed means to be moved to open-throat condition.

94. A front-feed calculating machine of the class described having a traveling paper carriage supporting a platen, front-feed means on said carriage for receiving and holding a work sheet in front-fed position, said front-feed means being movable from a closed to an open-throat condition and vice versa, a bail running the length of said carriage and connected to said front-feed means, a finger cooperating with said bail, means to operate said finger, means normally maintaining said operating means for said finger ineffective, a depressible key, and means operable by said key to condition said maintaining means to render said operating means effective to cause said finger in cooperation with said bail to move said front-feed means to open-throat condition.

95. A front-feed bookkeeping machine of the class described having a printing mechanism, means for holding a record sheet in printing position relative to said printing mechanism so that it will receive a running record of all transactions, a platen, front-feed means for enabling a work sheet to be front-fed relative to said platen and for holding said sheet in front-fed position, said front-feed means being separate from said printing mechanism and being movable from a closed to an open-throat condition and vice versa but normally remaining closed after it has been closed, columnar-printing control means for conditioning said machine to cause printing to occur in different predetermined columns on an inserted work sheet, motor-operated-throat-opening means operable by power derived independently of said columnar-printing control means, said throat-opening means normally being in ineffective condition, automatic means normally operable to condition said motor-operated-throat opening means to move said front-feed means to open-throat condition when said machine is conditioned for printing in a predetermined column on said work sheet, and key controlled means for causing said motor-operated-throat-opening means to open said throat at the will of the operator.

96. A front-feed calculating machine of the class described having a motor driving means for giving it cycles of operation, a traveling paper carriage supporting a platen, front-feed means for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means being movable from a closed to an open-throat condition and vice versa, throat-opening means operable by power derived from said motor driving means independently of carriage travel for moving said front-feed means to open-throat condition, said throat-opening means normally being inactive to open said throat during machine cycling operations of said motor driving means, and manipulative means operable at the option of the operator to condition said throat-opening means to enable it to move said front-feed means to open-throat condition with said carriage stationary.

97. A front-feed calculating machine of the class described having a motor driving means for giving it cycles of operation, a traveling paper carriage supporting a platen, front-feed means for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means being movable from a closed to an open-throat condition and vice versa, throat-opening means operated by power derived from said motor driving means independently of carriage travel for moving said front-feed means to open-throat condition, said throat-opening means normally being inactive to open said throat during machine cycling operations of said motor driving means, and manipulative means operable at the option of the operator to condition said throat-opening means to cause it to move said front-feed means to open-throat condition while said machine remains uncycled.

98. A front-feed machine of the class described having a printing mechanism, a traveling paper

carriage, a platen on said carriage, means for holding a record sheet about said platen, a front-feed paper chute movably mounted in front of said platen to receive and guide a work sheet under said platen from the front, said chute being movable from sheet-receiving to printing position and vice versa, power means operable by power derived independently of carriage travel for moving said chute, and key controlled means operable to control said power means in any columnar position of said carriage to cause said power means to move said chute to sheet-receiving position while said carriage remains in the selected columnar position.

99. A front-feed calculating machine of the class described having motor driving means for giving it cycles of operation, a traveling paper carriage, a platen on said carriage, a front-feed paper chute on said carriage which is movable from sheet-receiving to a sheet-holding position and vice versa, said chute having sheet-engaging devices associated with it to engage a front-fed work sheet above the printing line of said platen, sheet-engaging means on said carriage for engaging a front-fed work sheet below the printing line of said platen, said sheet-engaging means being movable from a sheet-engaging to a sheet-releasing condition and vice versa, power means operable by power derived from said motor driving means independently of carriage travel to move said chute and said engaging means to sheet-holding position, and manipulative control means operable to condition said power means in any columnar position of said carriage to enable said power means to move said chute to sheet-receiving position and said sheet-engaging means to sheet-releasing position.

100. A front-feed calculating machine of the class described having a printing mechanism, a traveling paper carriage, a platen on said carriage, means for holding a record sheet about said platen, a front-feed paper chute on said carriage which is movable from sheet-receiving to printing position and vice versa, sheet-holding devices on said carriage for holding a front-fed work sheet about said platen, said holding devices being movable from closed to open-throat condition and vice versa, power means operable by power derived independently of carriage travel to move said chute and said holding devices, and key conditioned means operable to control said power means in any columnar position of said carriage to enable said power means to move said chute to sheet-receiving position and said holding devices to open-throat condition while said carriage remains in the selected columnar position.

101. A front-feed calculating machine of the class described having means for giving it cycles of operation, a printing mechanism normally operated at a predetermined time during a machine cycle, a platen normally occupying a printing position relative to said printing mechanism but movable away therefrom to a front-feed position and vice versa, power means for moving said platen, said power means normally being ineffective for moving said platen, and means selectively controllable to condition said power means to enable it to move said platen to front-feed position, said power means being constructed and arranged so that, when it is then operated with said platen in front-feed position, said power means will cause said platen automatically to be returned to printing position prior to operation of said printing mechanism.

102. A front-feed calculating machine of the class described having a motor driving means, printing mechanism, a platen normally occupying a printing position relative to said printing mechanism but movable to a front-feed position to facilitate removal and insertion of work sheets, platen-moving means operated by power derived from said motor driving means for moving said platen to front-feed position, said platen-moving means normally being ineffective to move said platen, and control means for governing said platen-moving means operable to selectively cause said platen-moving means, when said platen is in front-feed position, automatically to move said platen to printing position.

103. A front-feed calculating machine of the class described having motor driving means for giving it cycles of operation, a printing mechanism normally operated at a predetermined time during each machine cycle, said printing mechanism including type carrying portions that are moved to make printing impressions, a platen normally occupying a printing position relative to said printing mechanism but movable to a front-feed position to facilitate the removal and insertion of work sheets, platen-moving means for moving said platen to front-feed position where it is held to enable one work sheet to be removed and another inserted, means for moving said platen toward printing position, and selectively controlled means for governing the return of said platen so as to cause it to be returned automatically to printing position at the beginning of a selected machine cycle and prior to operation of said printing mechanism.

104. A front-feed calculating machine of the class described having motor driving means for giving it cycles of operation, a printing mechanism normally operated at a predetermined time during a machine cycle, said printing mechanism including type carrying portions movable to make printing impressions, a platen normally occupying a printing position relative to said printing mechanism but movable to a front-feed position to facilitate the removal and insertion of work sheets, platen-moving means operated by power derived from said motor driving means for moving said platen to front-feed position and holding it in said position, and means controlling the operation of said platen-moving means in moving said platen to front-feed position enabling it, when next operated, to cause said platen to be returned automatically to printing position.

105. A calculating machine having an operating means, a platen urged into printing position relative to a printing mechanism, a bail operatively connected with said platen for moving it from its printing to an out-of-printing position, a power operated member positioned to engage said bail to operate it, means acting automatically during an operation of the calculating machine to control the movement of said member to cause it to move said bail to a predetermined position and to hold it in said position, and means actuated by said operating means in the succeeding operation of the calculating machine for restoring said member to free said bail to enable said platen to move to printing position.

106. A front-feed calculating machine of the class described having motor driving means for giving it cycles of operation, a printing mechanism normally operated at a predetermined time during each machine cycle, a platen normally occupying a printing position relative to said printing mechanism but movable to a front-feed

position to facilitate the removal and insertion of work sheets, means for moving said platen to front-feed position, means for returning said platen to printing position, and means for controlling said platen-moving means during a selected machine cycle to determine whether or not said platen will be returned automatically to printing position at the beginning of the next machine cycle and prior to operation of said printing mechanism.

107. A front-feed calculating machine of the class described having a motor driving means for giving it cycles of operation, printing mechanism, a platen normally in printing position relative to said printing mechanism but movable away therefrom to a front-feed position to facilitate the removal and insertion of work sheets, a traveling paper carriage, power means for moving said platen, said power means normally being inactive, and means controlled by said paper carriage for automatically determining whether or not said platen, when in front-feed position, will be returned automatically to printing position at the beginning of the next machine cycle.

108. A front-feed calculating machine of the class described having means for giving it cycles of operation, a platen, printing mechanism operated at a predetermined time during a machine cycle, front-feed means for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means being movable from a closed to an open-throat condition and vice versa, power means for moving said front-feed means to its different positions, said power means normally being ineffective for moving said front-feed means, and means selectively controllable to cause said power means to move said front-feed means to open-throat condition at selected times, said power means being constructed and arranged so that, when said machine is given a cycle with said front-feed means in open-throat condition, said power means will cause said front-feed means to be moved to closed-throat condition prior to operation of said printing mechanism.

109. A machine of the class described having a printing mechanism, means for giving the machine cycles of operation, a traveling paper carriage normally moved from one columnar position to another during a machine cycle, means on said carriage for holding a record sheet in printing position relative to said printing mechanism, means on said carriage for receiving and holding a work sheet in printing position relative to said printing mechanism, said work sheet holding means being movable from closed to open-throat condition and vice versa, means for moving said work sheet holding means to open-throat condition to permit one work sheet to be readily removed therefrom and another inserted, and means acting automatically, as said machine is given a cycle of operation after a new sheet has been placed in position and prior to traveling movement of said paper carriage, to cause said work sheet holding means to move to closed-throat condition to grip said sheet and hold it in printing position.

110. A front-feed calculating machine of the class described having a motor driving means for giving it cycles of operation, a platen, front-feed means for receiving and holding a work sheet in front-fed position, said front-feed means being movable from closed to open-throat condition and vice versa, normally inactive operating means operable by power derived from said motor driving means for moving said front-feed means to open-throat condition, and control means for conditioning said operating means to cause it, when said front-feed means is in open-throat condition, automatically to move said front-feed means to closed-throat condition.

111. A front-feed calculating machine of the class described having motor driving means for giving it cycles of operation, a printing mechanism normally operated at a predetermined time during a machine cycle, a platen, front-feed means for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means normally being in closed-throat condition but being movable from a closed to an open-throat condition and vice versa, throat-opening means for moving said front-feed means to open-throat condition where it is temporarily held, means for moving said front-feed means to closed-throat condition, and selective control means for governing the return of said front-feed means to closed-throat condition whereby, during the next machine cycle, said throat may be closed automatically prior to operation of said printing mechanism.

112. A front-feed calculating machine of the class described having motor driving means for giving it cycles of operation, a printing mechanism normally operated during a machine cycle, a platen, front-feed means for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means being movable from a closed to an open-throat condition and vice versa, throat-opening means operated by power derived from said motor driving means for moving said front-feed means to open-throat condition and for holding it in said condition, and means controlling said throat-opening means enabling it, when next operated, to cause said front-feed means to be returned automatically to closed-throat condition prior to operation of said printing mechanism.

113. A front-feed calculating machine of the class described having motor driving means for giving it cycles of operation, a platen, front-feed means for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means being movable from a closed to an open-throat condition and vice versa, throat-opening means for moving said front-feed means to open-throat condition, means for returning said front-feed means to closed-throat condition, and means for controlling said throat-opening moving means during a selected machine cycle enabling it to determine whether or not the front-feed means shall be automatically returned to closed-throat condition at the beginning of the next machine cycle.

114. A front-feed machine of the class described having means for giving it cycles of operation, a calculating mechanism, a printing mechanism normally operated at a certain point in the cycle of operation of said machine, means for conditioning said machine to perform a function that is to be recorded, means for holding a record sheet in printing position relative to said printing mechanism, a platen, front-feed means for enabling a work sheet to be front-fed relative to said platen and for holding said sheet in front-fed position, said front-feed means being movable from a closed to an open-throat condition and vice versa without disturbing said record sheet, means for causing a relative lateral movement between said work sheet and printing mechanism for causing printing to occur ir dif-

ferent columns on an inserted work sheet, means for moving said front-feed means to open-throat condition at selected times, and means controlled automatically to operate in a predetermined relative lateral position of said work sheet and printing mechanism when said throat is open, and during a cycle of operation of said machine after said machine has been conditioned for said function, to automatically close said front-feed throat prior to operation of said printing mechanism.

115. A front-feed machine of the class described having a printing mechanism, means for giving said machine cycles of operation, a platen movable from a printing position relative to said printing mechanism to a front-feed position and vice versa, means for holding a record sheet about said platen, pressure rolls cooperating with said platen to form a front-feed throat, said pressure rolls and platen being mounted to enable a relative movement to occur between them to open and close said front-feed throat and said pressure rolls being movable with said platen as it moves from printing to front-feed position and vice versa, means for moving said platen to front-feed position and said throat to open-throat position, and means acting automatically during a cycle of operation of said machine to cause a relative movement to occur between said pressure rolls and platen to close said throat and to move said platen to printing position.

116. A front-feed machine of the class described having means for giving it cycles of operation, calculating mechanism, a printing mechanism normally operated at a certain time in the cycle of operation of said machine, means for conditioning said machine to perform a function that is to be recorded; means for holding a record sheet in printing position relative to said printing mechanism, a platen, a front-feed paper chute movably mounted in front of said platen, said paper chute being movable from a sheet-receiving to a printing position and vice versa, and means operating automatically during a cycle of operation of said machine, and after said machine has been conditioned for said function, to automatically move said chute from sheet-receiving to printing position.

117. A front-feed machine of the class described having means for giving it cycles of operation, calculating mechanism, a printing mechanism normally operated at a certain point in the cycle of operation of said machine, means for conditioning said machine to perform a function that is to be recorded, a traveling paper carriage, a platen on said carriage, a front-feed paper chute movably mounted on said carriage in front of said platen for receiving and holding a front-fed work sheet in printing position relative to said platen, said paper chute being movable from a sheet-receiving to printing position and vice versa, and means operated automatically during a cycle of operation of said machine, in a predetermined position of said carriage, and after said machine has been conditioned for said function, to automatically move said front-feed paper chute from sheet-receiving to printing position.

118. A front-feed machine of the class described having a printing mechanism, a traveling paper carriage provided with a platen, means for holding a record sheet about said platen, a front-feed paper chute for guiding a work sheet bottom end first into front-fed position relative to said platen, said chute being movable from a work-sheet-receiving to a work-sheet-holding position and vice versa, and power means controlled by said carriage operable automatically in predetermined positions of said carriage to move said chute from sheet-receiving to sheet-holding position while said carriage remains stationary.

119. A front-feed machine of the class described having means for giving it cycles of operation, calculating mechanism, a printing mechanism normally operated at a certain point in the cycle of operation of said machine, means for conditioning said machine to perform a function that is to be recorded, a traveling paper carriage having a platen, means for holding a record sheet about said platen, a paper chute in front of said platen for guiding a work sheet into front-fed position relative thereto, said chute being movable from a sheet-receiving to printing position and vice versa, sheet-engaging means for engaging a front-fed work sheet and holding it about said platen, said sheet-engaging means being movable from a closed to an open-throat position and vice versa, and means operating automatically during a cycle of operation of said machine in a predetermined columnar position of said carriage, and after said machine has been conditioned for said function, to automatically move said chute from sheet-receiving to printing position and said sheet-engaging means from open to closed-throat position.

120. A machine of the class described adapted to be given cycles of operation, a printing mechanism normally operated during each cycle of operation of said machine, said printing mechanism including type carrying portions adapted to be moved to make printing impressions, a platen normally occupying a printing position relative to said printing mechanism but movable to a front-feed position and vice versa, means acting automatically during a predetermined cycle of operation of said machine to move said platen from printing to front-feed position and to retain it in said position, and means acting during a succeeding cycle of operation of said machine to automatically return said platen to printing position prior to operation of said printing mechanism during said succeeding cycle.

121. A front-feed calculating machine of the class described adapted to be given cycles of operation, a printing mechanism normally operated at a predetermined time during a machine cycle, a platen, front-feed means for receiving and holding a work sheet in front-fed position relative to said platen, said front-feed means being movable from closed to open-throat condition and vice versa but normally being in closed-throat condition, power operated means for moving said front-feed means to its different conditions, said power means normally being ineffective to move said platen, and means selectively controllable to condition said power means to enable it, during a machine cycle initiated while said front-feed means is in open-throat condition, automatically to cause said front-feed means to move to closed-throat condition prior to operation of said printing mechanism and automatically to move to open-throat condition after said printing mechanism has operated.

122. In a front-feed machine of the class described adapted to be given cycles of operation, a printing mechanism, means for holding a record sheet in printing position relative to said printing mechanism, front-feed means for holding a front-fed work sheet in printing position relative to said mechanism, said front-feed means being movable from closed to open-throat condition and vice versa, means operating automati-

cally during a predetermined cycle of operation of said machine to move said front-feed means to open-throat condition to permit one work sheet to be readily removed and another inserted, and means acting automatically during the next cycle of machine operation, and while said front-feed means remains in the same lateral position relative to said printing mechanism as it occupied when said sheet was inserted, for moving said front-feed means to closed-throat condition to automatically grip the inserted work sheet to hold it in position for an operation of said printing mechanism.

123. A front-feed machine of the class described having a calculating mechanism, a printing mechanism, a traveling paper carriage provided with a platen, means for holding a record sheet about said platen, front-feed means on said carriage for enabling a work sheet to be front-fed relative to said platen and for holding said sheet in front-fed position, said front-feed means being movable from a closed to an open-throat condition and vice versa, and power means operable by power derived independently of carriage travel and automatically under the control of said carriage to both open and close said front-feed throat.

124. A front-feed machine of the class described having means for giving it cycles of operation, calculating mechanism, a printing mechanism normally operated at a certain time during a cycle of operation of said machine, a platen normally occupying a printing position relative to said printing mechanism but movable therefrom to a front-feed position and vice versa, means for holding a record sheet about said platen, front-feed means for enabling a work sheet to be front-fed relative to said platen and for holding said sheet in front-fed position, said front-feed means being movable from a closed to an open-throat condition and vice versa, and means operating during a cycle of machine operation to automatically move said platen to printing position and to close said front-feed throat prior to operation of said printing mechanism and to automatically move said platen to front-feed position and open said throat after operation of said printing mechanism.

125. In a front-feed machine of the class described adapted to be given cycles of operation, a printing mechanism, a traveling paper carriage, a platen on said carriage, said platen being movable to and from printing position relative to said printing mechanism, means for holding a record sheet about said platen in feeding relation thereto, front feed means for receiving and holding a front-fed work sheet in printing position relative to said printing mechanism, said front-feed means being movable from closed to open-throat condition and vice versa, means controlled by said paper carriage acting automatically during a cycle of operation of said machine in a predetermined position of said carriage to move said platen with its record sheet out of printing position and said front feed means to open-throat condition to enable one work sheet to be readily removed and another inserted, and means acting automatically during the succeeding cycle of machine operation while said carriage remains in said predetermined position to move said front-feed means to closed-throat condition to grip the inserted work sheet and to subsequently move said platen to printing position.

126. A front-feed machine of the class described having a printing mechanism, a traveling paper carriage provided with a platen, means for holding a record sheet about said platen, a front-feed paper chute on said carriage for guiding a work sheet from the front into front-fed position relative to said record sheet, said paper chute being movable from a sheet-receiving to a sheet-holding position and vice versa, and power means operable by power derived independently of the carriage travel but under the control of said carriage for moving said paper chute both from sheet-receiving to sheet-holding position and from sheet-holding to sheet-receiving position.

127. A front-feed machine of the class described having a calculating mechanism, a printing mechanism, a traveling paper carriage, a platen on said carriage having a printing line, means for holding a record sheet about said platen, a front-feed paper chute for guiding a work sheet into front-fed position relative to said record sheet, said paper chute being movable from a sheet-receiving to a sheet-holding position and vice versa, sheet-engaging means associated with said chute and movable therewith for engaging the unfed end of an inserted work sheet above the printing line of said platen, and means operating automatically under the control of said paper carriage for moving said chute from sheet-receiving to sheet-holding position and said sheet-engaging means to sheet-engaging position and to also move said paper chute from sheet-holding to sheet-receiving position and said sheet-engaging means to sheet-releasing position.

128. A front-feed machine of the class described having means for giving it cycles of operation, calculating mechanism, a printing mechanism, means for conditioning said machine to perform a function that is to be recorded, a platen, means for holding a record sheet about said platen, front-feed means for enabling a work sheet to be front-fed relative to said platen and for holding said sheet in front-fed position, said front-feed means being movable from a closed to an open-throat condition and vice versa without disturbing said record sheet, a paper chute for guiding work sheets under said platen from the front, said chute being movable from a sheet-receiving to a sheet-holding position and vice versa, and means operating automatically during a cycle of operation of said machine and after said machine has been conditioned for said function, to automatically close said front-feed throat and move said paper chute to sheet-holding position for an operation of said printing mechanism and to subsequently open said front-feed throat and move said paper chute to sheet-receiving position.

129. A front-feed machine of the class described having means for giving it cycles of operation, calculating mechanism, a printing mechanism normally operated at a certain point in the cycle of operation of said machine, means for conditioning said machine to perform a function that is to be recorded, means for holding a record sheet in printing position relative to said printing mechanism, a platen, front-feed means for enabling a work sheet to be front-fed relative to said platen and for holding said sheet in front-fed position, said front-feed means being movable from a closed to an open-throat condition and vice versa without disturbing said record sheet but being normally in closed-throat condition, a front-feed paper chute for guiding a work sheet from the front into said throat when

it is open, means for causing a relative lateral movement between said work sheet and printing mechanism to cause printing to occur in different columns on an inserted work sheet, and means controlled automatically to operate in a predetermined lateral position of said work sheet and printing mechanism and during a cycle of operation of said machine after said machine has been conditioned for said function, to automatically close said front-feed throat to grip an inserted work sheet prior to operation of said printing mechanism to enable a record of said function to be made on said sheet and to automatically open said throat to release said sheet after said printing mechanism has operated to enable said sheet to be readily removed and another inserted.

130. A front-feed machine of the class described having means for giving it cycles of operation, calculating mechanism, a printing mechanism normally operated at a certain point in the cycle of operation of said machine, means for conditioning said machine to perform a function that is to be recorded, a traveling paper carriage having a platen, front-feed means on said paper carriage for enabling a work sheet to be front-fed relative to said platen and for holding said sheet in front-fed position, said front-feed means being movable from a closed to an open-throat condition and vice versa, a front-feed paper chute on said carriage for guiding a work sheet from the front into said throat when it is open, and means controlled by said carriage operating automatically, in a predetermined position of said carriage and during a cycle of operation of said machine after said machine has been conditioned for said function, to automatically close said front-feed throat to grip an inserted work sheet prior to operation of said printing mechanism and to automatically open said throat to release said sheet after said printing mechanism has operated so that said sheet can be readily removed and another inserted.

131. A front-feed calculating machine of the class described having a general operating mechanism for the calculating mechanism of the machine and means for giving said general operating mechanism cycles of operation; a printing mechanism; a platen, front-feed means for enabling a work sheet to be front fed relative to said platen, said front-feed means having portions movable from a normal closed-throat condition in which they hold the front-fed sheet about said platen in printing position relative to said printing mechanism to an open-throat condition in which said sheet may be easily removed and another inserted, and vice versa; columnar-printing control means including a device movable to control the columnar-printing condition of said columnar-printing control means; throat-opening means actuated by power derived from said cycling means during a cycle of operation of said general operating mechanism for moving said front-feed means to open-throat condition; and means controlled by said movable device for selectively controlling said throat-opening means in accordance with the columnar-printing condition of said columnar-printing control means to determine the cycle during which said power shall be applied to move said front-feed means to open-throat condition.

132. A front-feed calculating machine of the class described having a general operating mechanism for the calculating mechanism of the machine and means for giving said general operating mechanism cycles of operation; a printing mechanism; a platen, front-feed means for enabling a work sheet to be front fed relative to said platen, said front-feed means having portions movable from a normal closed-throat condition in which they hold a front-fed sheet about said platen in printing position relative to said printing mechanism to an open-throat condition in which said sheet may be easily removed and another inserted, and vice versa; power transmitting mechanism between said cycling means and said front-feed means for moving said front-feed means to open-throat condition, said power transmitting mechanism normally being ineffective to open said throat; columnar-printing control means including a device normally moved during each cycle of operation of said general operating mechanism for controlling the columnar-printing condition of said columnar-printing control means; and means governed by said movable device for controlling the effectiveness and ineffectiveness of said power transmitting mechanism in accordance with the columnar-printing condition of said columnar-printing control means.

133. A front-feed calculating machine of the class described having means for giving it cycles of operation; a printing mechanism; a platen, front-feed means for enabling a work sheet to be front fed relative to said platen, said front-feed means having portions movable from a normal closed-throat condition in which a front-fed sheet is held about said platen in printing position relative to said printing mechanism to an open-throat condition in which said sheet may be easily removed and another inserted, and vice versa; columnar-printing control means including a device movable to control the columnar-printing condition of said columnar-printing control means; throat-opening means actuated by power derived from said cycling means independently of the power of movement of said movable device for moving said front-feed means to open-throat condition; and means controlled by said movable device for governing said throat-opening means in accordance with the columnar-printing condition of said columnar-printing control means.

134. A front-feed calculating machine of the class described having means for giving it cycles of operation; a printing mechanism; a platen, front-feed means for enabling a work sheet to be front fed relative to said platen, said front-feed means having portions movable from a normal closed-throat condition in which a front-fed sheet is held about said platen in printing position relative to said printing mechanism to an open-throat condition in which said sheet may be easily removed and another inserted, and vice versa; columnar-printing control means including a device movable during a machine cycle for controlling the columnar-printing condition of said columnar-printing control means; power transmitting mechanism between said cycling means and said front-feed means for moving said front-feed means to open-throat condition, said power transmitting means normally being ineffective to open said throat; and manipulative means for rendering said power transmitting means effective independent of any movement or position of said movable device.

135. A machine of the class described having a printing mechanism, a traveling paper carriage supporting a platen, said platen being mounted

on said carriage so as to be movable from its normal printing position relative to said printing mechanism to an out-of-printing position and vice versa, power means operable in each of the columnar positions of the carriage by power derived independently of traveling movement of said carriage to move said platen to its out-of-printing position, means rendering said power means ineffective, and means controlled by said carriage operating automatically to disable said rendering means in a predetermined columnar position of said carriage.

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