

July 7, 1942.

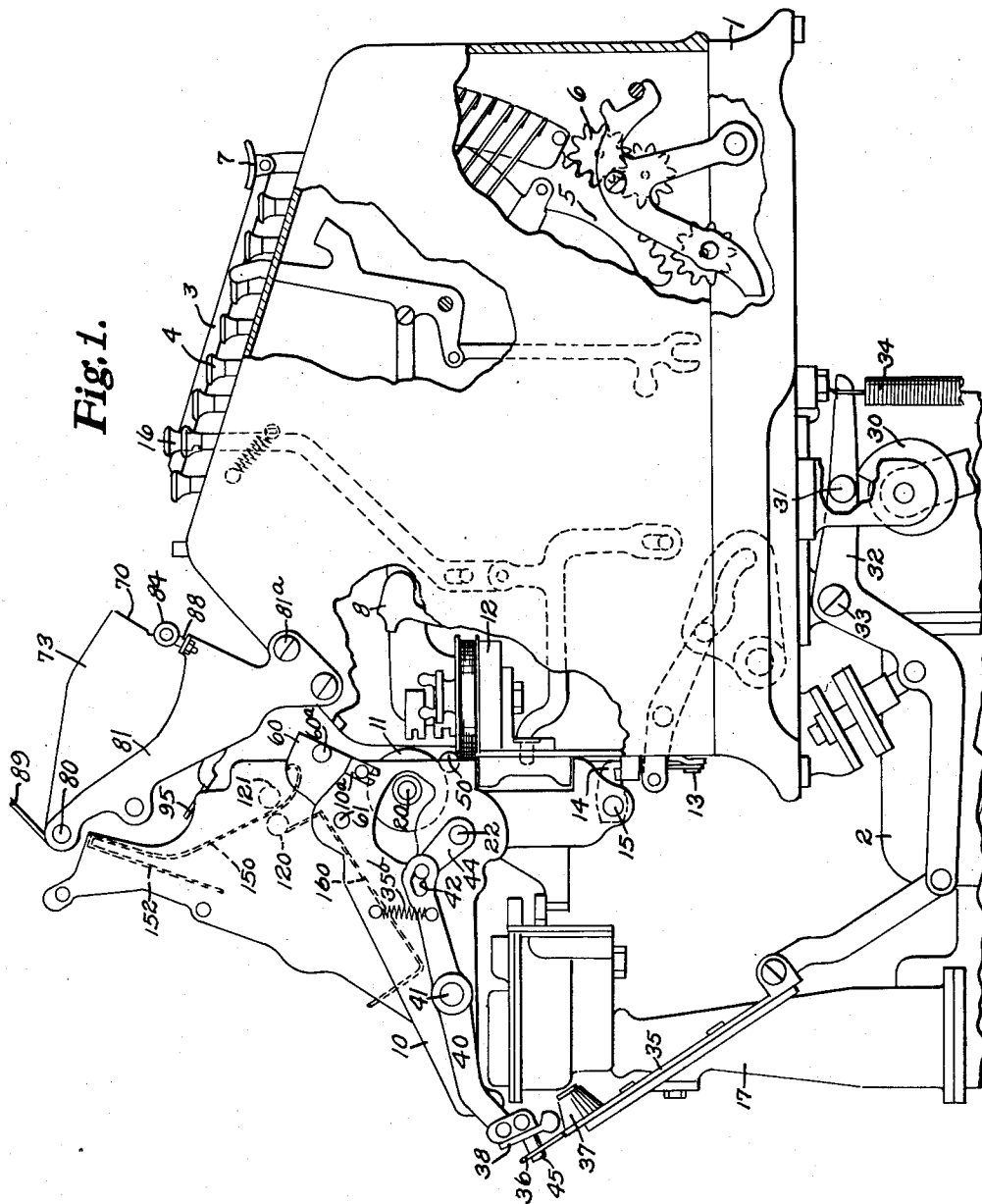
A. J. FETTIG

2,288,797

CALCULATING MACHINE

Filed Dec. 6, 1939

5 Sheets-Sheet 1



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5 Sheets-Sheet 2

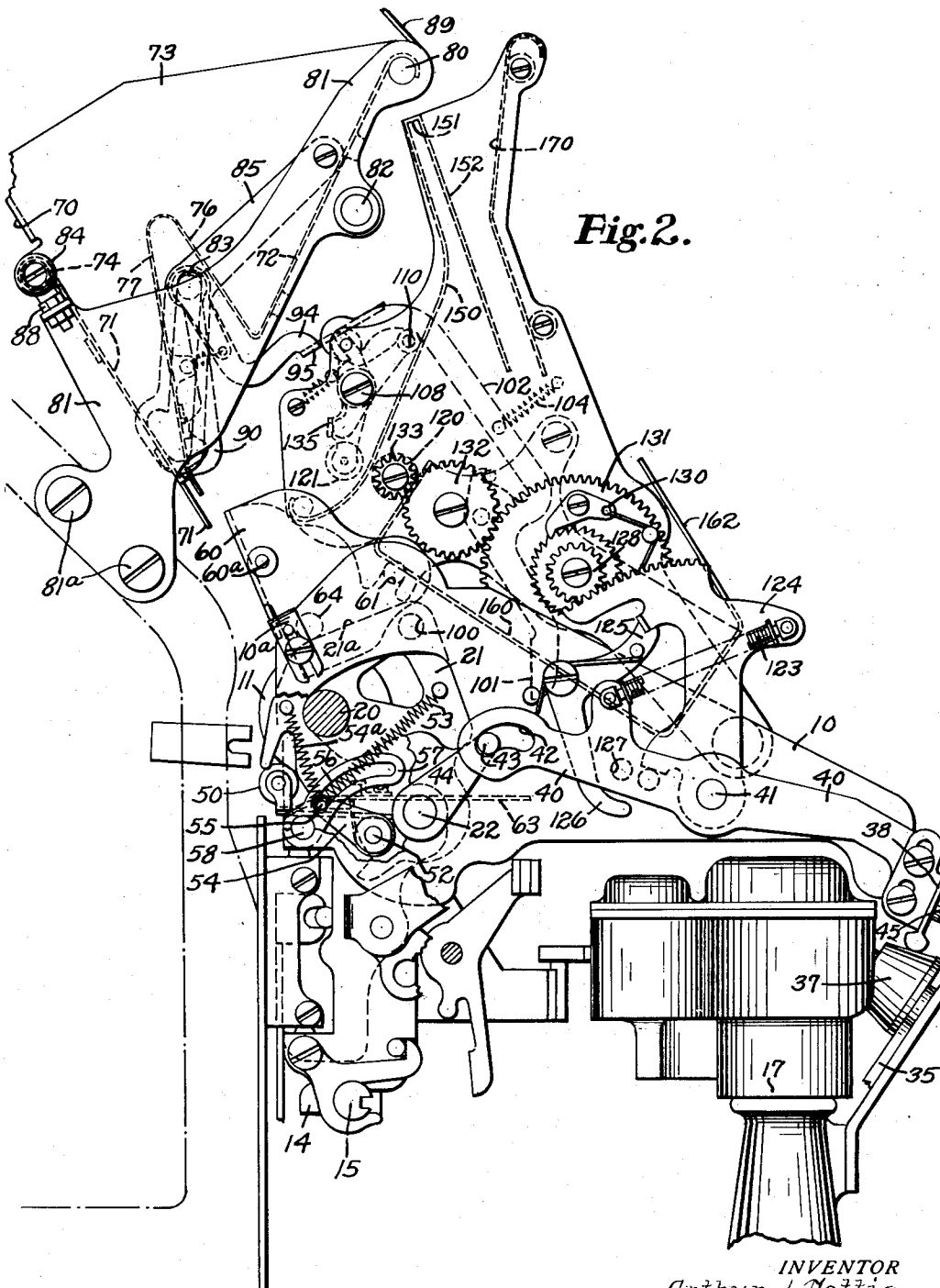


Fig. 2.

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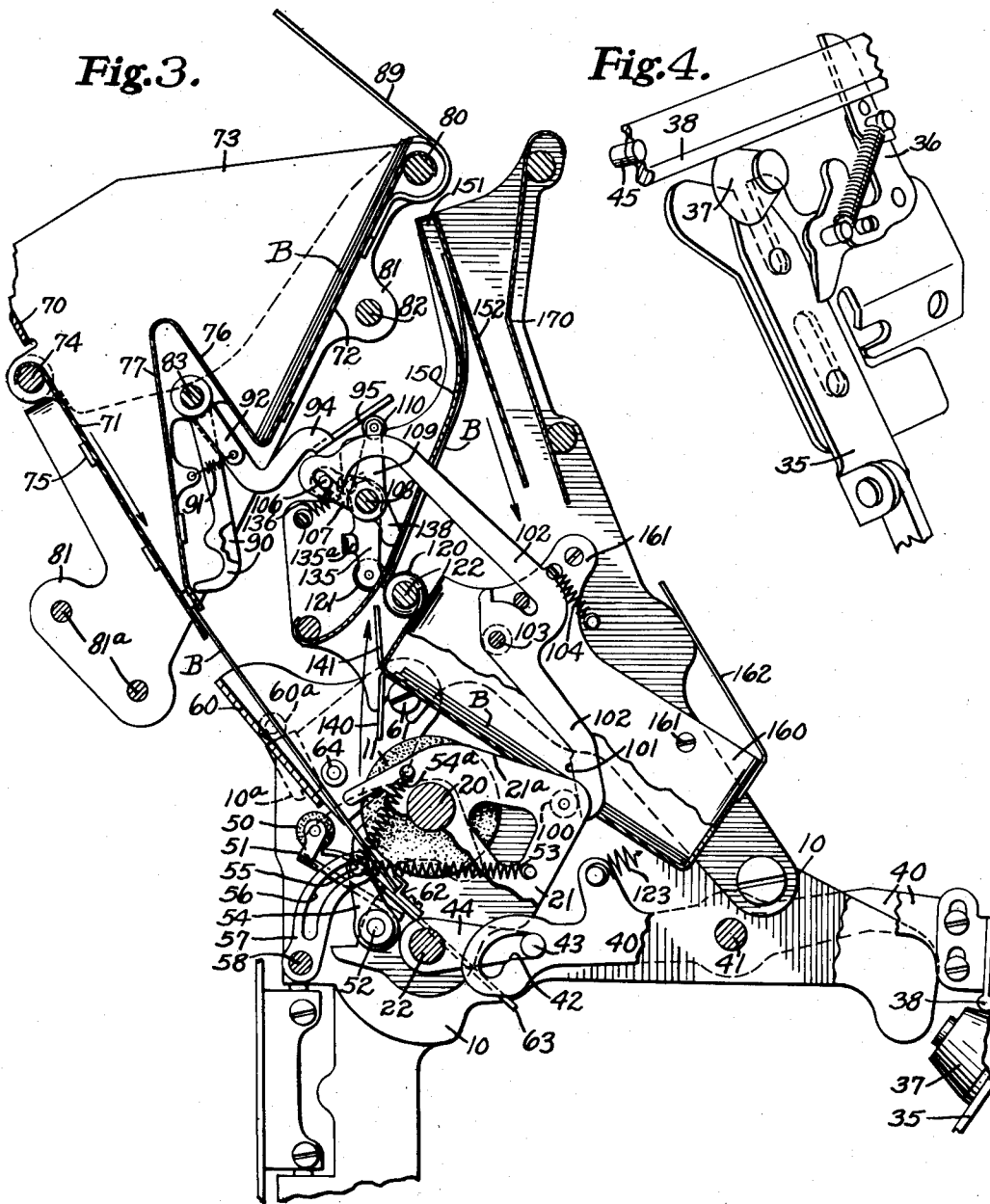
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CALCULATING MACHINE

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5 Sheets-Sheet 3



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Fig. 5.

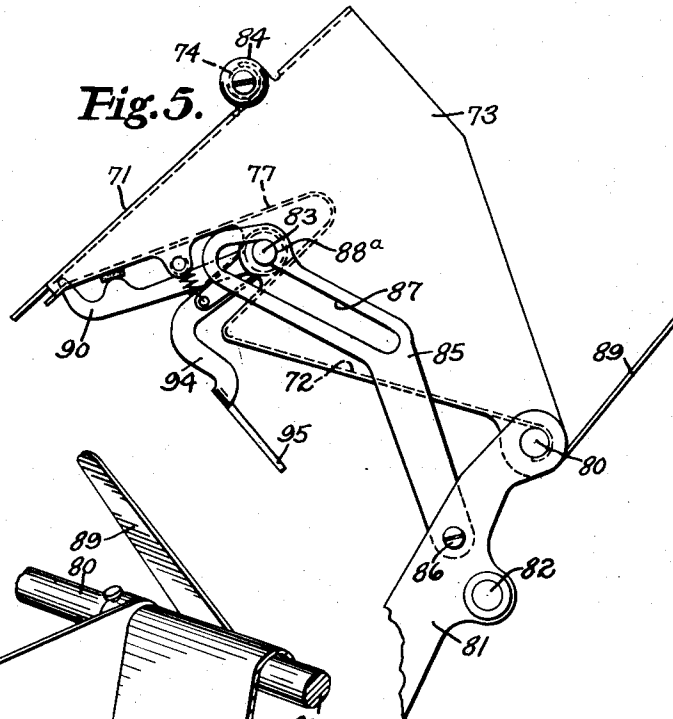
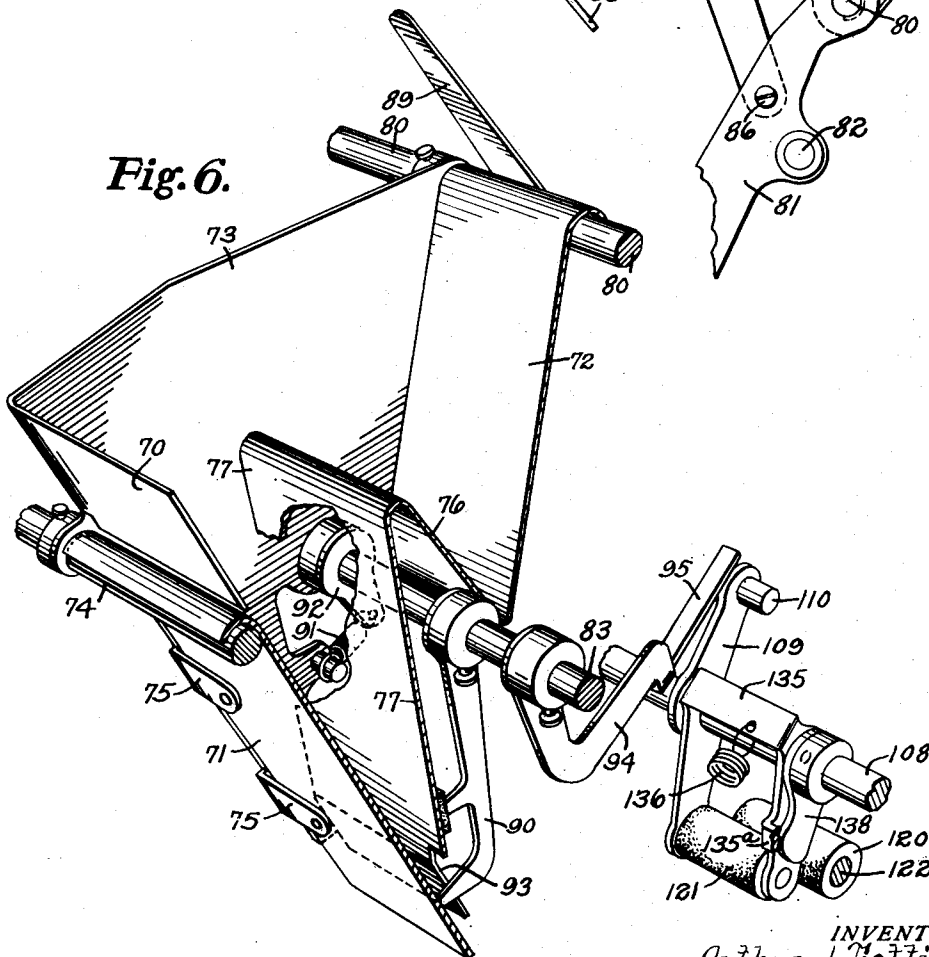


Fig. 6.

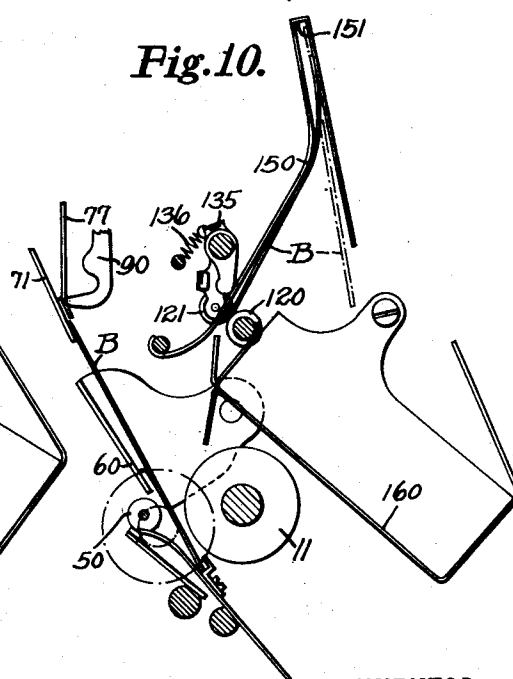
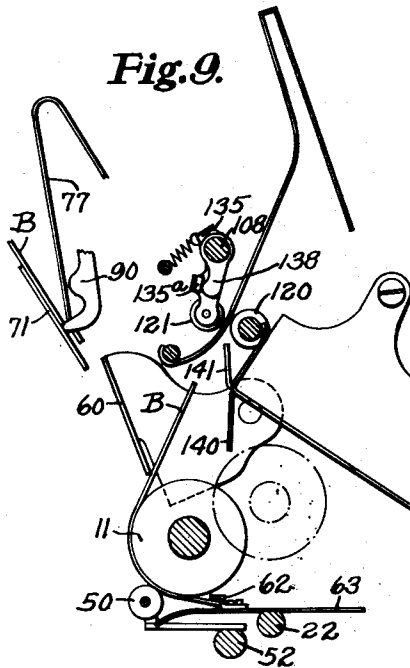
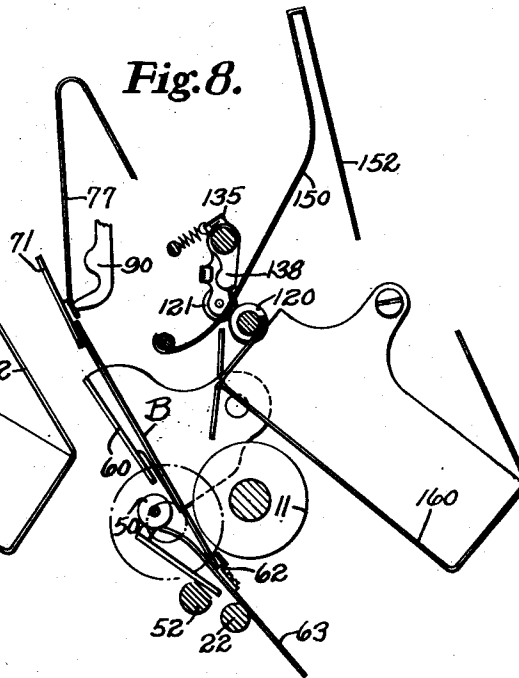
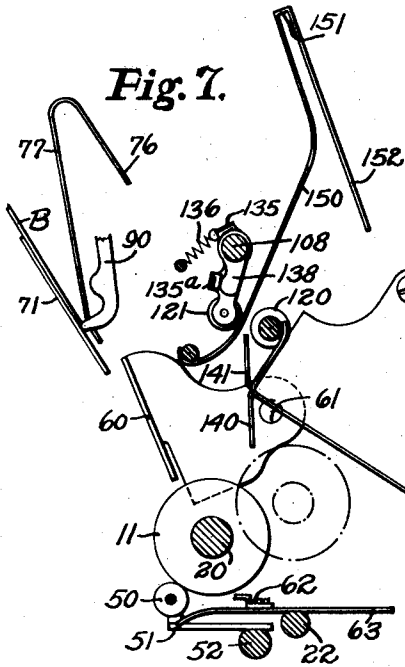


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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

2,288,797

CALCULATING MACHINE

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Application December 6, 1939, Serial No. 307,762

8 Claims. (Cl. 197—127)

This invention relates to a calculating machine. It is particularly concerned with the paper handling equipment of such a machine and relates to improvements for facilitating the feeding of work sheets into such a machine and to improved means for ejecting and stacking the sheets in desired order.

The invention is an improvement in certain respects on the machine disclosed in Muller 2,110,399, March 8, 1938.

The general object of the invention is to provide an improved paper handling equipment for a calculating machine.

A more specific object is to provide an improved means for facilitating the feeding of work sheets to a calculating machine.

Another particular object is to provide an improved means for ejecting work sheets and stacking them face downward in a receptacle.

Other objects and advantages of the invention 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 machine with the invention applied thereto.

Figure 2 is a right side elevation of the rear portion of the machine with the invention applied thereto, the parts being shown in normal printing position;

Figure 3 is a partial, right-side, sectional elevation of a portion of the paper equipment, the parts being in the position they occupy with the front-feed throat open and the platen moved to a "throw-back" position;

Figure 4 is a detail view of a portion of the power operating mechanism for actuating some of the parts.

Figure 5 is a detail view of the latching device for holding the paper feeding means in a position to permit access to other parts of the machine.

Figure 6 is a detail perspective view and a sectional view of the paper feeding portion of the invention; and

Figure 7, 8, 9 and 10 are diagrammatic views showing the different positions of a work sheet as it is fed into and ejected from the machine.

The invention is shown as it is applied to the well-known Burroughs calculating machine equipped with front-feed paper handling equipment. The body of the machine and some of the mechanisms have been illustrated but no attempt has been made to illustrate all parts of the machine as these are well known and their

illustration does not appear necessary in the present case. The machine is illustrated and described in many prior patents such as Burroughs 505,078 which shows the type of printing mechanism; Vincent 866,750 which shows the type of motor drive; Rinsche 1,172,484 which shows the subtraction and "fugitive 1" mechanisms; Muller 1,397,774 which shows numerous carriage controls; Gascon No. 1,395,991 and Muller 1,843,648 which show certain controls of the printing mechanism; Rinsche 1,580,534 which shows the carriage moving equipment; and Pasinski Patents Nos. 1,778,506 and 1,911,768 which show certain subtraction and multiple register improvements.

General machine features

The main body of a Burroughs machine is shown at 1 in Fig. 1. The machine is cycled by means of a motor 2 controlled by a motor bar 3. Items are indexed on amount keys 4 which control actuators 5. The actuators control a registering mechanism 6 and associated devices for enabling calculations to be performed. Totals may be taken under the control of a total key 7. The machine has a printing mechanism, portions of which are shown at 8, the printing mechanism being operated at an appropriate time during a machine cycle to print an item that has been entered, or the total of a number of items, as the case may be.

In order to control the column in which printing shall occur, a column-printing control means is provided in the form of a traveling paper carriage 10 supporting a platen 11 which is line spaced as described in Kreis 913,738 and Rinsche 1,580,534. The carriage is moved laterally across the machine in one direction by a spring drum 12 under the control of a tabulating mechanism of which portions are shown at 13, said mechanism being described in detail in Vincent 929,056 and Rinsche 1,580,534. The various positions of the carriage are determined by tab stops 14, which are adjustable on a tabulating rock shaft 15. The carriage normally moves in tabulating direction near the end of each machine cycle but it may be held stationary by a carriage normal key 16 which may be made a "live" key as described in Muller 1,787,489.

The carriage is moved in the opposite direction by a carriage return mechanism contained in the housing 17 and driven by the machine motor as described in Rinsche 1,580,534.

The machine has a front-feed paper equipment that includes portions that may be moved

from a closed to an open-throat condition and vice versa as disclosed in British Patent No. 382,613 and German Patent No. 647,638. This equipment is of the type in which the platen is moved to a "throw-back" position when the throat is opened and is returned to printing position when the throat is closed. The platen 11, which is carried by a shaft 20 (Fig. 3), is supported by a rocking frame 21 pivoted at 22. In normal printing position, the platen occupies the position shown in Fig. 2 but, by rocking the frame 21 clockwise about its pivot, the platen may be moved to what is called the "throw-back" or "front-feed" position, of Fig. 3. The opening of the throat and the rocking of the platen may be accomplished by hand as disclosed in said British patent but it is preferably done by power and controlled automatically, the power-operated automatic control being illustrated in the present case.

Referring to Fig. 1, the motor 2 rotates the snail cam 30 one revolution during each machine cycle. As this cam rotates, it acts on a roller stud 31 carried by a lever 32 pivoted at 33. The cam rocks said lever counterclockwise and thereby tensions a spring 34 fixed at one end to said lever and at its other end to a stationary stud on the machine. When said lever is rocked, it pulls down on a slide 35 which is thereupon latched in position by a latch 36 shown in Fig. 4. The power of the motor is thus temporarily stored in the spring slide mechanism and this action takes place during the first part of the machine cycle so that the mechanism is ready to operate during the latter part of said cycle, this arrangement providing flexibility as to the time during the cycle when the throat opening mechanism shall operate. The upper end of the slide 35 carries a roller stud 37 positioned to engage a bail 38 carried by two levers 40 pivoted to the paper carriage at 41 (Fig. 2), there being a lever on each side of the carriage. The forward ends of these levers are provided with cam slots 42 in which are positioned studs 43 on the ends of cranks 44 fixed to the shaft 22 which rocks the platen frame. When the platen is in printing position, the parts occupy the position shown in Fig. 2.

As described in said British and German patents, the mechanism may be released manually but is preferably automatically controlled by means of one or more studs 45 (Figs. 1 and 4) carried by the bail 38. The arrangement is such that, when the paper carriage reaches a predetermined position, a stud 45 trips the latch 36 whereupon the slide 35 moves upward and the roller stud 37, acting on the bail 38, moves said bail upward to rock the levers 40 counterclockwise. This rocks the platen to "throw-back" position where it is temporarily held. It may be held by a latch or it may be held by the slide 35, both forms of construction being disclosed in said British and German patents. In the present case, the latch has not been illustrated and the device is shown as held upward by the slide 35 as shown in Fig. 3.

The platen is automatically returned to printing position at the beginning of the ensuing machine cycle, and prior to operation of the printing mechanism, by the release of the bail 38 through the drawing down of the slide 35 under the control of the cam 30 which rotates at the beginning of the cycle. The platen is returned by gravity and a spring 35b (Fig. 1).

Thus, it will be seen that the platen is thrown back by power derived from the motor, which power is temporarily stored in a spring mechanism so as to give flexibility of adjustment. This power may be released at an appropriate time and preferably automatically by the carriage. The platen is returned automatically to printing position at the beginning of the next machine cycle without any attention on the part of the operator and prior to operation of the printing mechanism.

The front-feed throat is of the type that is formed by a set of feed rolls 50 (Fig. 3) cooperating with the platen 11. These feed rolls are supported by levers 51 fixed to a shaft 52 that is journaled in the rocking platen frame 21. The shaft 52 is urged clockwise (Fig. 3) by springs 53 and 54^a attached to a crank 54 fixed to the shaft 52 so that the feed rolls 50 are urged toward the platen. The crank arm 54 carries a stud 55 operating in a slot 56 in a member 57 pivoted at 58 to the carriage frame.

In the normal closed throat condition of the parts shown in Fig. 2, the feed rolls 50 are in engagement with the platen 11 and the stud 55 is near the bottom of the slot 56. As the platen is rocked rearward, the feed rolls 50 move with it and the stud 55 moves upward and rearward in the slot 56. The length of this slot is such that, slightly before the platen reaches its "front-feed" or "throw-back" position, the stud 55 engages the upper end of the slot 56 to prevent further movement of the upper end of lever 54. Consequently, as the platen frame rocks further rearward, the shaft 52 carrying crank 54 will be rocked rearward but the upper end of the crank cannot move. Thus, further bodily movement of the feed rolls will be prevented while the platen moves away from them, and the throat of the front-feed means will be opened.

As the platen 11 returns toward printing position it moves toward the feed rolls 50 and engages them, after which both the feed rolls and the platen continue their movement to the printing position of Fig. 2. Thus, the front-feed throat is closed at the beginning of the movement of the platen toward printing position and it remains closed while the platen is in printing position.

Immediately above the front-feed throat is a short paper guide or table 60 pivoted at 61 to the paper carriage. When the front-feed throat is open, as shown in Fig. 3, the paper table occupies the position there shown, where it serves to assist in guiding a sheet to front-feed position relative to the platen, the sheet limiting against adjustable stops 62 on a lower guide 63. The position of the table is determined by the engagement of a stud 60^a on it with an adjustable stop 10^a on the carriage. When the platen is returned to printing position, the upper guide or table 60 is rocked clockwise about its pivot 61 by the engagement of a cam edge 21^a of the platen frame (Fig. 2) with a stud 64 on the table. During this movement, the lower edge of the paper table 60 engages the upper free end of the work sheet and swings the sheet about the platen thereby helping to hold the sheet in printing position as illustrated in the diagrammatic view of Fig. 9.

Except for slight modifications apparent from the drawings and the above description, the front-feed means and its operation are, in general, the same as that disclosed in said British patent.

Public utility billing

In order that the invention may be more clearly understood, a typical example of work to be performed and the various problems connected with that work will be explained.

The paper handling equipment has been developed particularly to handle public utility bills. These are made out on relatively long and rather narrow sheets of paper, familiar to almost every user of gas or electricity. The operator of a machine such as disclosed herein receives a stack of these bills with the customer's name already printed or stenciled thereon, and his job is to enter the proper items on the bill for each customer from information he obtains from a meter reader's book, the latter being the book that the meter reader takes with him as he goes from door to door reading customers' meters. When the operator receives these bills they are in "door-to-door" order in exactly the same way as the meter reader's records in his book. The operator takes the first bill, places it in the machine, looks at the entries in the meter reader's book for the customer whose bill has been placed in the machine, enters the items, and operates the machine to make the necessary entries on the bill, after which, as will be presently explained, the bill is automatically ejected from the machine.

After the operator has completed the making out of a group of bills, they go to another department, where further checking is done and other records made which require that the bills remain in "door-to-door" order, as originally stacked. Consequently, it is important that, as the bills are ejected from the machine, they be stacked in the same "door-to-door" order as when received by the operator and one of the important advantages of the present invention is that this result is obtained in a very simple and inexpensive construction which places a minimum load on the paper carriage.

Thousands of these bills must be made out every month by large utility companies, and it naturally follows that every effort is made to facilitate handling bills and speeding up the work. In the machine shown in Muller Patent No. 2,110,399, a stack of bills is supported by the traveling carriage and the operator takes these one by one and places them in the machine. This construction has two disadvantages, namely, the stack of bills places a load on the paper carriage which is undesirable since the objective in calculating machines of the type in question is to lighten the load on the carriage rather than increase it. The second objection is that the stack of bills is not always in the same place in front of the operator, moving to the different columnar positions of the carriage, or the carriage may be moving at the time the operator attempts to take a bill from a stack. In the present invention, both these disadvantages have been overcome by relieving the paper carriage entirely of the load of the bills and by keeping them in a stationary position so that they are always in the same position in front of the operator.

In Muller Patent 2,110,399, a mechanism was provided which is supported by the paper carriage and which is operated after the sheet has been ejected to bodily lift the sheet and turn it over, face downward, into a receptacle. This requires considerable mechanism, the mechanism occupies considerable space, provision must be made for operating the mechanism, and a meas-

urable load is placed on the carriage. The present invention overcomes these difficulties.

Paper feeding

To facilitate handling the bills or work sheets, a paper feeding device, which also acts as a magazine to receive a supply of bills, is fixed to the machine instead of to the carriage. This feeding device is preferably positioned toward the right side of the machine so that it is in proper relation to the carriage when the latter is in its right-hand or "home" position.

The paper feeding device is in the form of a paper chute or guide that is substantially V-shaped in cross section as shown in Figs. 2 and 3. It comprises a front plate made in two pieces 70 and 71 and a back plate 72. The front and back plates are joined by suitable end plates 73, one of which is clearly shown in Fig. 6. The end plates are integral with the upper end of the front plate 70 and this upper end is mounted on a shaft 74 that extends laterally across the front end of the chute. The lower portion 71 of the front plate has its upper end curved, and this curved end is hooked over the shaft 74, the body of said front plate 71 resting against lateral lugs 75 (Fig. 6) extending from the end plates. The back plate 72 is bent upward and forward to form the portion 76 which, in cooperation with the back plate, forms a pocket or magazine to receive a stack of bills B as shown in Fig. 3. The back plate is then bent downward again to form the portion 77 that converges toward the front plate 71 so as to form a V-shaped pocket for the receipt of work sheets, there being a narrow opening at the bottom between the two plates. The upper end of the back plate 72 is curved and it hooks over a shaft 80 carried by two supporting arms 81 fixed to the machine by the screws 81^a. The end plates 73 are also journaled on this shaft 80. The supporting arms 81 are joined by the cross shaft 82 in addition to shaft 80, to make a rigid construction. The shaft 83 is journaled in the end plates 73 for a purpose that presently will appear.

This mounting of the feeding device enables the main body of it to be swung clockwise about the shaft 80 from the position of Fig. 3 to that of Fig. 5 to give free access to the platen and associated parts and to facilitate insertion of a record sheet about the platen when such is used. In order that the body of the feeding device may be easily swung upward, a knob 84 (Fig. 5) is provided on the end of shaft 74 by means of which the operator can rock the parts to the position of Fig. 5. The feeding device is releasably held in this position by a latch 85 (Fig. 5) pivoted at 86 to one of the supporting arms 81. This latch has a slot 87 in it that receives the end of the shaft 83, the slot being provided with a shoulder 88^a that engages said shaft when the parts are thrown to the upper position of Fig. 5. The latch 85 tends to move counterclockwise in Fig. 5 by gravity, the arrangement being such that, when the chute is thrown to its upper position, the latch will fall over the shaft 83 and temporarily hold the parts in such position. The operator may release the feeding device for movement to normal position by lifting the latch 85 and as the device returns to normal the shaft 74 limits against an adjustable stop 88 (Fig. 2) on one of the supporting arms 81. The back plate 72 is provided with an extension 89 that prevents the stack of bills B from sliding out when the feeding device is raised to its Fig. 5

position. This extension also has the important function of acting as a guide for enabling the operator to pass unused bills to the rear as presently will appear.

In using the feeding device, the operator takes a bill B from the stack in the magazine and places it in the V-shaped opening between the front plate 70—71 and the portion 77 of the back plate where, however, the bill is temporarily held by the following mechanism.

Fixed to the shaft 83 and positioned in the channel on the under side of the back plate 72 formed by the reverse folds heretofore described, is a series of fingers 90. The shaft 83 is journaled in the end plates 73 and urged clockwise, as viewed in Figs. 2 and 3, by a spring 91 attached at one end to the back plate 77 and at the other end to an arm 92 fixed to shaft 83. The lower ends of the fingers are shaped to project through openings 93 (Fig. 6) in the portion 77 of the back plate 72. Fixed to the shaft 83 is another arm 94 having a rearwardly projecting portion 95 (Fig. 6). It will be obvious that, if the arm 94—95 is rocked counterclockwise, the fingers 90 will be withdrawn to the positions of Figs. 3 and 8, and that the bill that has been placed in feeding position on said fingers will then be free to drop past the fingers into the front-feed throat.

Inasmuch as the feeding device is stationary, whereas the paper carriage moves, and inasmuch as it is not desired to permit a bill to drop while the front-feed throat is closed, provision is made for controlling the fingers so as to feed the bill only at the proper time, that is, when the carriage is in a predetermined position and when the front-feed throat is open. The platen frame 21 (Fig. 3) is provided with a stud 100 which, when the frame is rocked rearward, engages the abutment face 101 of a lever 102 pivoted at 103 and urged clockwise by a spring 104. The upper end of lever 102 has a slot in which is positioned a stud 106 on a crank 107 fixed to a shaft 108 journaled in the carriage frame. Fixed to this shaft 108 is an arm 109 carrying a roller stud 110 positioned to engage the under surface of the portion 95 of the arm 94—95. When the front-feed throat is opened, and assuming that the roller stud 110 is in line with the under surface of the arm 94—95, the stud 100 on the platen frame will engage and rock the lever 102 counterclockwise. This will rock the shaft 108 counterclockwise and the arm 109 with its roller stud 110 will rock counterclockwise to thereby move the fingers 90 to releasing position.

However, the above action does not occur unless the paper carriage is properly aligned with the feeding device so that the bill will fall into proper position relative to the endwise position of the platen. This is controlled by making the arm 94—95 narrow and by making the roller stud 110 narrow so that, whenever the carriage is away from its "home" position, the roller stud will not be in line with the arm and, even though the front-feed throat is opened, the fingers 90 will not be released. The carriage position in which the roller stud 110 is in alignment with arm 94—95 can, of course, be varied.

In the preferred embodiment, the front-feed throat is opened and the bill on which operations have been performed is ejected upon the return of the carriage across the machine as presently will be described, and this operation is delayed until the carriage reaches its "home"

position so that, at the time the old bill is ejected, the feeding means is operated to cause a new bill to move into the front-feed throat. This timing of operations is accomplished by having the stud 45 on a bail 38 that trips the latch 36 located so that said stud engages the latch just as the carriage reaches its "home" position which causes the throat to be opened after the carriage reaches said position and after roller stud 110 is in alignment with arm 94—95.

To summarize, when the carriage moves to a predetermined position, the bill on which entries have been made is automatically ejected, while, at the same time, another bill is fed into the open throat so that when the throat is closed the machine is in condition to begin operation on a second bill.

Paper ejecting and delivering mechanism

The individual bills or work sheets are ejected upward and rearward away from the platen by an ejecting means such as shown in said Muller Patent 2,110,399. Portions of this mechanism have been illustrated and it will be described briefly but, for an understanding of all its details, reference is made to said Muller patent.

Mounted above and slightly to the rear of the platen are two sets of ejecting rolls 120 and 121 (Fig. 3) which are rotated by power derived from the motor through the means that opens the front-feed throat. The primary ejecting rolls 120 are fixed to a shaft 122 journaled in the carriage frame. Referring to Fig. 2, a spring 123 is connected between the lever 40 of the platen rocking mechanism and a sector 124 pivoted at 41 in the carriage frame. This sector is prevented from rocking counterclockwise in Fig. 2 by a spring held bell-crank latch 125 having a tail 126. As the lever 40 is moved counterclockwise (Fig. 2) by the slide 35 and roller stud 37, the spring 123 is tensioned because the sector 124 cannot move. When the lever 40 approaches the end of its movement, a stud 127 on said lever engages the tail 126 of the latch 125 and rocks said latch clockwise to thereby release the sector 124. The sector is immediately moved counterclockwise by its spring and said sector acts to rotate a gear 128 clockwise. The gear 128, acting through a pawl and ratchet connection 130 rotates a larger gear 131 clockwise. The gear 131 rotates an intermediate gear 132 counterclockwise and the latter rotates a gear 133 clockwise, the gear 133 being connected to the shaft 122 carrying the ejecting roll 120. The result is that, after the front-feed throat is opened the ejecting roll 120 is rapidly rotated to eject the bill upwardly and rearwardly free of the platen.

The ejecting rolls 121 are not positively driven and are, in effect, pressure rolls to insure that the bill will be properly gripped against the rolls 120 so that, when the latter rotate, the bill will be ejected. The rolls 121 are carried on the lower ends of yokes 135 pivoted on the shaft 108 and urged counterclockwise by springs 136 (Figs. 6—10). The counterclockwise movement of said yokes is limited by the engagement of a lug 135^a (Fig. 6) on each with a corresponding arm 138 fixed to the shaft 108. It will be recalled that shaft 108 is controlled by a lever 102 whose lower end has an abutment face 101 positioned in the path of a stud 100 on the platen frame 21. These parts are proportioned and located so that, when the platen is thrown from printing to "front-feed" position the stud 100

engages the lower end of lever 102 and rocks it against the tension of its spring 104 to rock the shaft 108 counterclockwise, thereby allowing the yokes 135 to move counterclockwise to move the pressure rolls 121 into engagement with the bill 5 that may then be between it and the power rotated ejecting rolls 120. These parts were previously described in connection with paper feeding but they are parts that form part of the ejecting mechanism, which parts have been used 10 to control the feeding device.

When the front-feed throat is closed and the platen is in the printing position of Fig. 1, the sets of ejecting rolls are separated as illustrated in Figs. 2 and 9. It will be observed from Fig. 9 15 that the upper end of the bill B is below the ejecting rolls but it is directed toward the space between them, being held in position by the pivoted guide or table 60. As the bill is line spaced, its upper end moves toward the space between the ejecting rolls but normally does not reach them as the result of this operation. However, as the front-feed throat is opened and the platen 20 thrown back, the upper end of the bill is moved between the ejecting rolls and then at an appropriate time as described in said Muller Patent 2,110,399, the ejecting rolls are rapidly rotated to eject the bill, the front-feed throat having, in the meantime, been opened. To facilitate proper 25 movement of the bill between the feed rolls, sheet metal guides 140 and 141 are provided, as shown in Fig. 9, these guides being a portion of the sheet-receiving receptacle to be presently described. When the throat is closed and the platen 30 rocked to printing position, the rolls 121 are moved away from rolls 120 by the action of spring 104 on lever 102.

The bills B are stacked face downward in a receptacle supported by the paper carriage through a very simple construction that makes 40 use of the resiliency of the paper and its tendency to straighten out after being bent.

Referring to Fig. 3, a sheet metal guide 150, whose lower end serves to guide the sheet between the ejecting rolls, extends upward and rearward and is bent slightly forward. This guide then extends rearward at right angles at 151 a short 45 distance and then extends downward at 152 substantially parallel to the forward bend of the guide, the line of these two parallel portions being that in which it is desired to discharge the bills. A U-shaped pocket is thus formed to receive the upper ends of the bills as they are ejected, the 50 portion 152 serving to guide the sheets into the pocket and the base of the U forming a limit against which the bills may strike if they are ejected far enough. As a bill is ejected its upper end is bent, as shown in Figs. 3 and 10, so that said upper end is substantially parallel to the plane in which it is desired to discharge the bill. 60 When the lower end of the bill is released by the ejecting rolls, the sheet straightens out to the dot-dash position of Fig. 10 and, the sheet being then unsupported, drops by gravity into a receptacle 160. This receptacle is attached to the carriage frame at 161 and is preferably located at an angle as shown in Fig. 3. The bill drops into this receptacle and each bill drops face downward 65 on the one preceding it. Thus the bills are automatically set in the same "door-to-door" order as when received by the operator. The receptacle has a rear extension 162 to prevent bills from moving out of the receptacle, particularly when it is well filled. The guides 140 and 141 are 70 preferably stuck out of portions of the receptacle.

Important advantages of this construction are that no movable parts are required; no operating mechanism is necessary; there is no noise connected with its operation; it can be made exceedingly light because the guides can be made of very thin, light metal; it occupies very little space; and it places very little load on the carriage. At the same time it has been found to operate very efficiently to control the bills as they 10 are ejected so as to cause them to be automatically stacked face downward in the receptacle.

It sometimes happens that no entries are to be made on certain bills in which event it would be a waste of time to put them through the machine, yet at the same time it is desired to have these bills stacked in proper order with the bills on which entries are being made. A very simple provision has been made for enabling this to be accomplished.

In the event the operator does not desire to make an entry on a bill he simply places it on the extension 89 and allows it to slide rearward. The paper carriage is provided with a guide plate 170 (Fig. 3) which is spaced from the guide plate 152, the upper end of the plate 170 diverging rearwardly relative to the plate 152 to form a wide 25 throat. The plate 170 together with the plate 152 forms a chute for receiving a bill from the extension 89 and guiding it downwardly and rearwardly in a manner such that it will fall face downward in the receptacle 160. This adds no complicated parts to the construction yet at the same time it provides a most convenient arrangement for enabling the unused bills to be stacked 30 in proper relation without requiring that they be put through the machine.

In order to maintain the bills in the proper door-to-door order the bill on which no entries are to be made should not be moved rearward until the bill in the machine has been ejected and is in the receptacle 160. This ejection takes place when the carriage is in its "home" position and hence, at the time the operator places the unused bill on extension 89, the carriage with the chute 152-170 is in line with said extension. 45

Operation

In using the machine, the operator proceeds as follows:

He receives a stack of bills which are in "door-to-door" order and places them in the magazine portion of the feeding device. The paper carriage should be in its right-hand or "home" position. In this position, the front-feed throat is open and the fingers are in the position of Fig. 3. The operator takes the first bill and places it face downward against the front plate of the feeding device and allows it to drop into the front-feed throat where it rests against the stops 50 62 as shown in Fig. 8. He then makes the necessary entries on the amount keys and gives the machine a cycle of operation whereupon the front-feed throat will be automatically closed prior to the printing operation. Near the end of said cycle, the carriage moves in tabulating direction to a predetermined column to receive 55 another entry. As the front-feed throat closes the sheet-holding fingers 90 will be moved to holding position as shown in Fig. 9. At any time after the closing of the throat in the "home" position of the carriage, and during either the tabulating or the return movement of the carriage, the operator can drop a new sheet into position against the fingers 90 as shown in Fig. 9. 70 The operator makes the necessary entries in the

various columnar positions of the carriage and, after predetermined operations, the carriage return mechanism is set into operation to return the carriage to its "home" position. Such return usually occurs at the end of a machine cycle initiated by depression of the motor bar. As the carriage reaches its "home" position the front-feed throat is opened automatically, the sheet upon which entries are made is ejected and stacked face downward in the receptacle, and the sheet that the operator has just placed in feeding position will be allowed to drop down in the open throat by the moving of the paper fingers to the position of Fig. 10 where these operations are illustrated diagrammatically.

The operator is then ready to repeat the operations above described on the second bill and to place a third bill in position for feeding.

In the event the operator does not want to make entries on a bill he simply places it on the guide 89 and allows it to drop rearwardly into its proper position in the receptacle.

From this it will be seen that a very simple construction has been provided that places a minimum weight on the carriage yet provides a maximum convenience for the operator, and a construction that will not only automatically stack the bills in proper door-to-door order but also one that enables unused bills to be easily placed in their proper position in the stack.

I claim:

1. A machine of the class described having means for giving it cycles of operation, a printing mechanism, a traveling paper carriage, front-feed means on said carriage and including portions movable from an open-throat condition for receiving a front-fed work sheet to a closed-throat condition for holding said sheet in printing position and from closed throat to open-throat condition, sheet-receiving means laterally stationarily supported on said machine for receiving a second work sheet placed therein while the first work sheet is held in printing position, sheet-holding means for temporarily holding said second work sheet in said sheet-receiving means, and power means controlled automatically in accordance with the position of said paper carriage and operating automatically during a cycle of operation of said machine to open said front-feed throat, automatically eject the first work sheet and condition said sheet-holding means to cause the second work sheet to move into said front-feed throat.

2. A machine of the class described having means for giving it cycles of operation, a printing mechanism, a traveling paper carriage, front-feed means on said carriage and including portions movable from an open-throat condition for receiving a front-fed work sheet to a closed-throat condition for holding said sheet in printing position and from closed throat to open-throat condition, sheet-receiving means laterally stationarily supported on said machine for receiving a second work sheet placed therein while the first work sheet is held in printing position, sheet-holding means for temporarily holding said second work sheet in said sheet-receiving means, and power means controlled automatically in accordance with the position of said paper carriage and operating automatically during a cycle of operation of said machine to open said front-feed throat, automatically eject the first work sheet and condition said sheet-holding means to cause the second work sheet to move into said front-feed throat, said power means

operating automatically during the next cycle of operation of the machine to close said front-feed throat to grip the second work sheet in printing position and to re-enable said sheet-holding means.

3. A machine of the class described having a traveling paper carriage, front-feed means for receiving and holding a work sheet in front-fed position, said front-feed means including portions movable from a closed to an open-throat condition and vice versa, means for moving said front-feed means to open-throat condition, a paper-feeding means supported in a stationary position on said machine, sheet-holding means associated with said paper feeding means for temporarily holding a work sheet in feeding position, and means controlled by said carriage in accordance with its position, and operated by said front-feed moving means as the latter is moved to move the front-feed means to open-throat condition, for moving said sheet-holding means to release the work sheet held by it to thereby enable said sheet to move into the open front-feed throat.

4. A machine of the class described having a traveling paper carriage, front-feed means for receiving and holding a work sheet in front-fed position, said front-feed means including portions movable from a closed to an open-throat condition and vice versa, means for moving said front-feed means to open-throat condition, a paper-feeding chute supported in stationary position on said machine in position to guide work sheets to said front-feed means, paper fingers associated with said chute for temporarily holding a work sheet in feeding position, and means controlled by said carriage in accordance with its position, and operated by said front-feed moving means as the latter is moved to move said front-feed means to open-throat condition, for moving said fingers to release the work sheet held by them to thereby enable said sheet to move into the open front-feed throat.

5. A machine of the class described having a traveling paper carriage, front-feed means for receiving and holding a work sheet in front-fed position, said front-feed means including portions movable from a closed to an open-throat condition and vice versa, means for moving said front-feed means to open-throat condition, a paper-feeding chute supported by said machine in a stationary position, said chute including a magazine portion for supporting a stack of work sheets and other portions for guiding a work sheet to said front-feed means so that a work sheet may move by gravity into said front-feed means, paper fingers associated with the guiding portions of said chute for temporarily holding a work sheet in feeding position, means controlled by said carriage in accordance with its position, and operated by said front-feed moving means as the latter is moved to move said front-feed means to open-throat condition, to move said fingers to release the work sheet to enable it to move into the open front-feed throat by gravity, and arresting means for arresting the sheet in a predetermined line-space position.

6. A front-feed machine of the class described having a printing means, a rotatable platen movable bodily from printing position relative to said printing means to an out-of-printing position and vice versa, means for holding a front-fed work sheet in printing position on the front of said platen, sheet-ejecting means positioned above said platen, said ejecting means being

mounted to enable it to be moved bodily away from said platen to facilitate access to the latter, said ejecting means including portions that are normally operated automatically to eject said work sheet when said platen is moved from printing position to out-of-printing position, a front-feed sheet-feeding means above said platen mounted for movement bodily away from said platen to facilitate access to the latter, sheet-holding means on said sheet-feeding means for temporarily holding a second work sheet in front-feeding position in said sheet-feeding means, and operating connections for disabling said sheet-holding means and causing said second sheet to move to front-fed position relative to said platen when said platen moves from printing position to out-of-printing position, said operating connections including portions that are automatically disabled when either said sheet-feeding means or said ejecting means is moved away from said platen and re-enabled when said sheet-feeding means and ejecting means are in normal position.

7. A machine of the class described having a platen and means to hold a work sheet in printing position relative to said platen to enable said sheet to receive printing impressions on its face, a receptacle for ejected sheets to the rear of said

platen, means for ejecting a work sheet that is in printing position face upward over said platen, sheet-inverting means comprising guide members for inverting the ejected sheet and delivering it face downward into said receptacle, and auxiliary means including a guide member of said inverting means for enabling an unused sheet to be passed rearward independently of said platen and said ejecting means, which auxiliary means acts to deliver the unused sheet face downward in said receptacle.

8. A machine of the class described having a platen and means to hold a work sheet in printing position relative to said platen to enable said sheet to receive printing impressions on its face, a receptacle for ejected sheets, means for ejecting a work sheet that is in printing position face upward over said platen, and sheet-inverting means for inverting the ejected sheet and delivering it face downward into said receptacle, said inverting means including a guide member at the rear thereof, said guide member extending downward and to the rear of said ejecting means for enabling an unused sheet to be passed rearward over said platen and said ejecting means to deliver said unused sheet face downward in said receptacle.

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