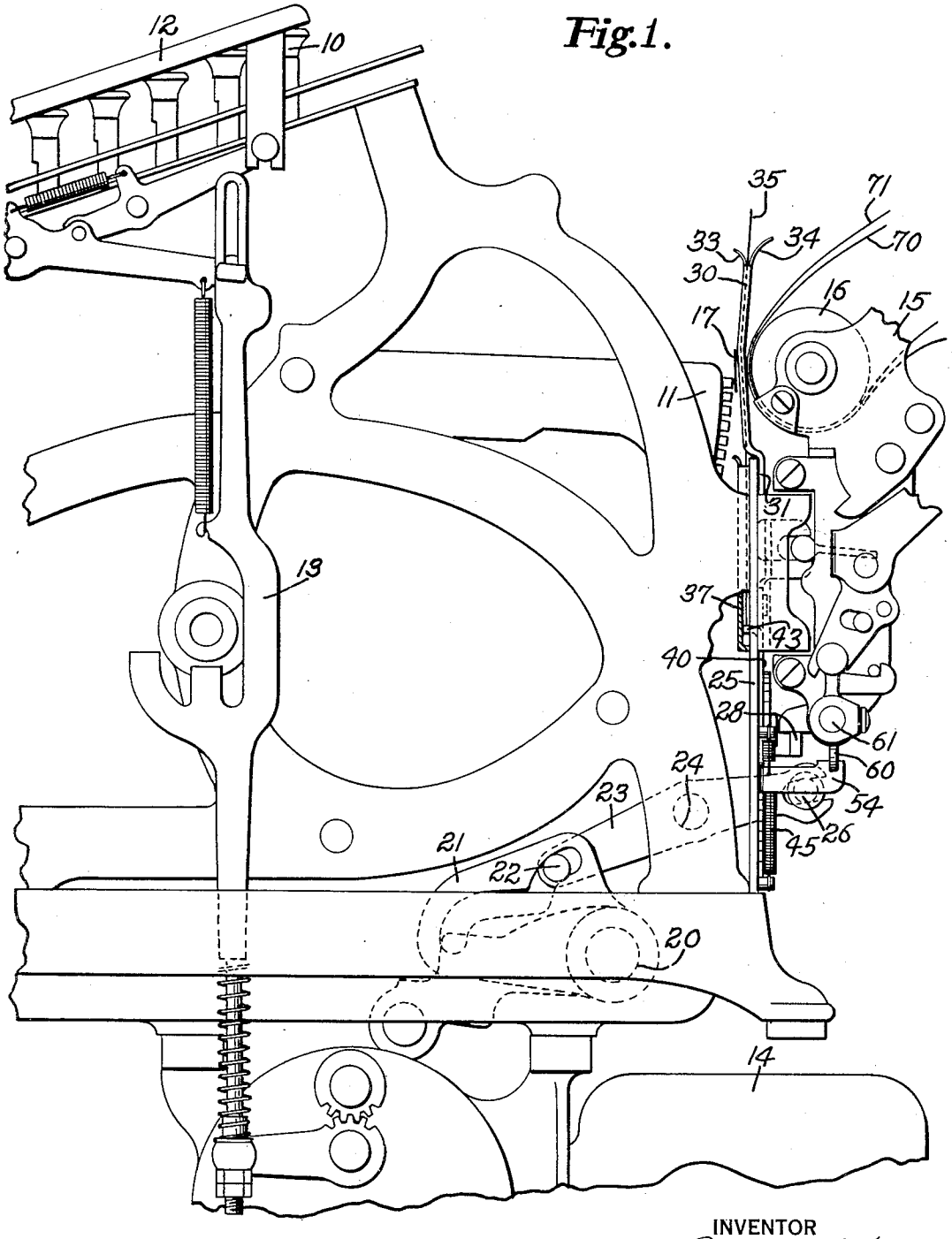
March 6, 1934. R. L. MULLER 1,949,918

CALCULATING MACHINE

Filed Aug. 3, 1931 3 Sheets-Sheet 1

Fig.1.



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Filed Aug. 3, 1931 3 Sheets-Sheet 2

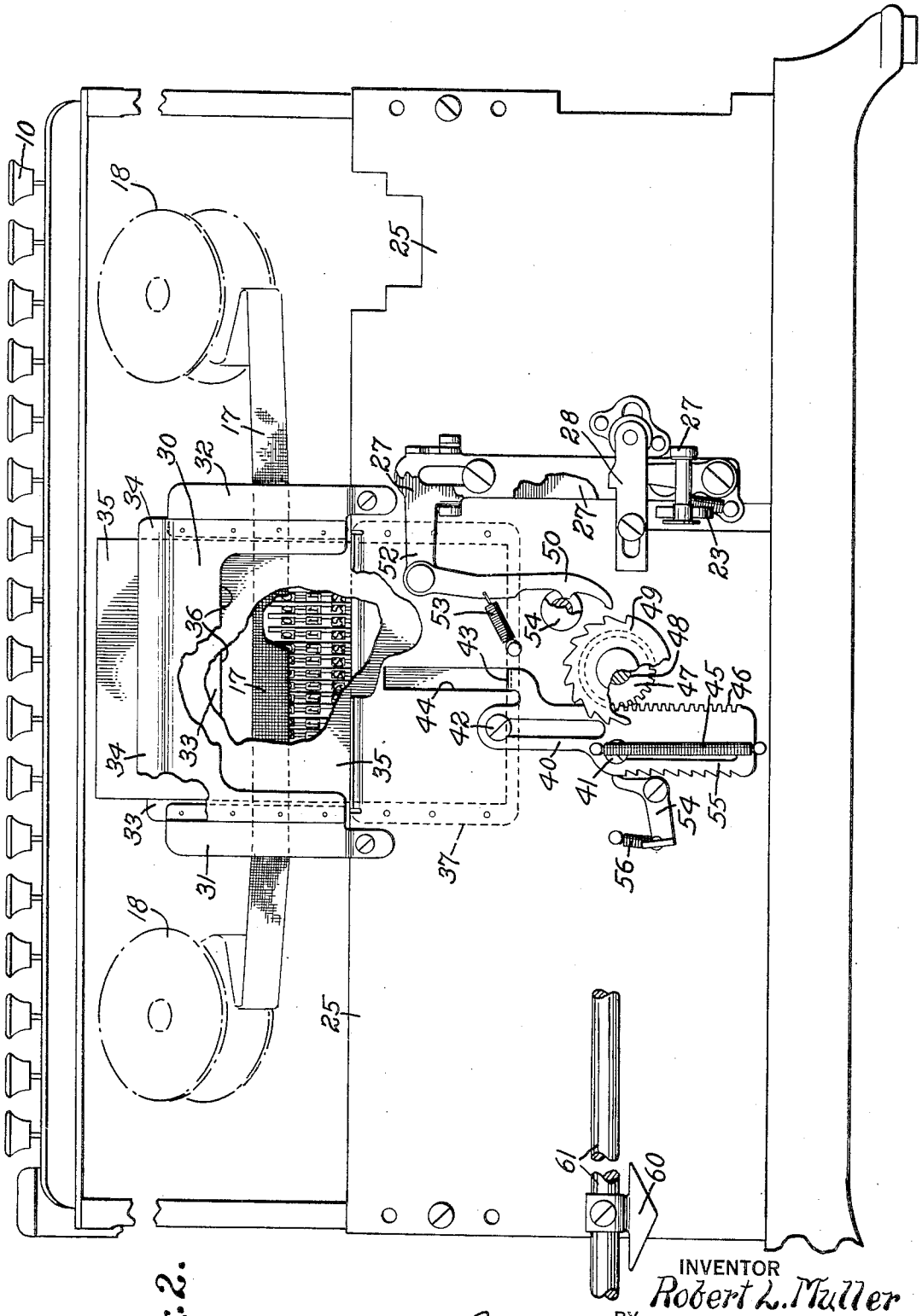


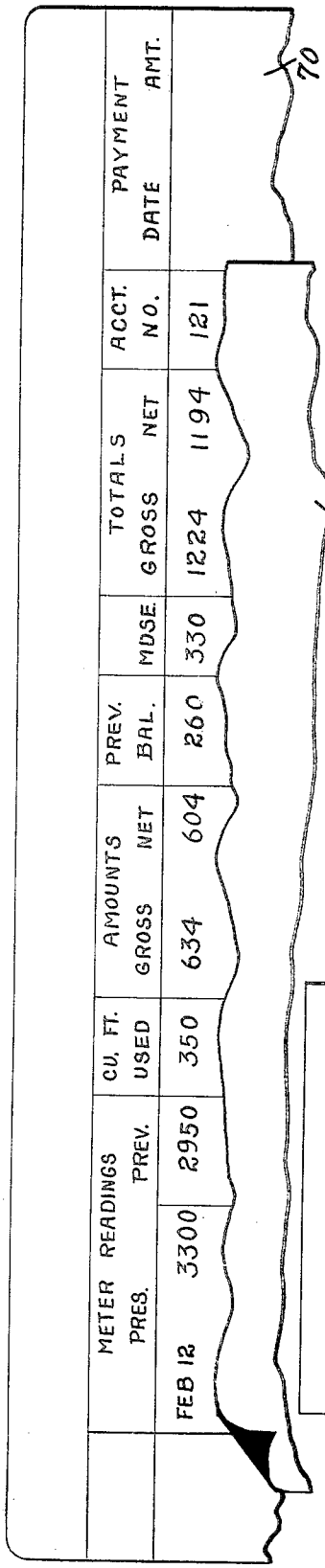
Fig. 2.

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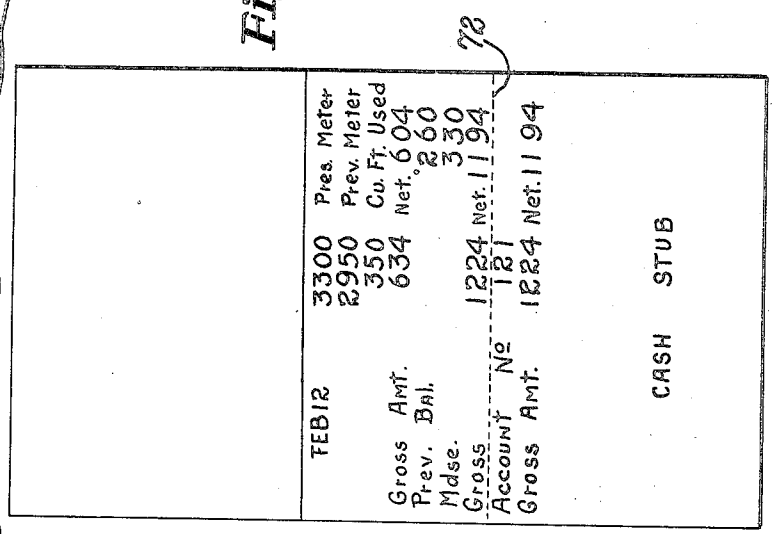
Filed Aug. 3, 1931 3 Sheets-Sheet 3



METER READINGS PRES.	PREV.	CU. FT. USED	AMOUNTS GROSS	NET	PREV. BAL.	MDSE.	TOTALS GROSS	NET	ACCT. NO.	PAYMENT DATE	AMT.
FEB 12 3300	2950	350	634	604	260	330	1224	1194	121		

Fig. 3.

Fig. 4.



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Patented Mar. 6, 1934 1,949,918

UNITED STATES PATENT OFFICE

1,949,918

CALCULATING MACHINE

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Application August 3, 1931, Serial No. 554,657

9 Claims. (Cl. 197—128)

This invention relates to a calculating machine and it is particularly concerned with the paper equipment for such machine. The nature of the invention will be most easily understood by first explaining the type of work that is to be performed.

At present, most public utility companies make out their customers' bills on relatively long narrow strips of paper on which the entries are made by tabulating the paper laterally across a machine. This type of bill is used because the bookkeeping record is made out at the same time that the bill is written and it is highly desirable to have the bookkeeping entries in a horizontal line. The bill is of such length that it must be folded one or more times and then placed in an envelope for mailing to the customer.

The present invention has in view the printing of a customer's bill on a postal card at the same time that the bookkeeping record is made. The use of a postal card saves the expense of folding a bill and putting it into an envelope and also saves paper and postage. One of the difficulties is, however, that a postal card is so narrow that the necessary entries for a public utility bill cannot be printed in a horizontal line. But a horizontal line of entries is necessary for the ledger sheet or other bookkeeping record of the company. These difficulties are overcome by the novel mechanism hereafter described.

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

A more particular object is to provide a mechanism that will enable entries to be made in a vertical column on a postal card or the like while the same entries are being made horizontally on a ledger sheet or the like.

Other and more particular objects of the invention will hereinafter appear.

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

Figure 1 is a partial right side elevation of a calculating machine with the invention applied thereto.

Fig. 2 is a rear view of the machine with the major portion of the paper carriage eliminated so as to show the mechanism for controlling the postal card.

Fig. 3 illustrates a typical ledger sheet entry.

Fig. 4 shows a form of postal card for receiving the entries made on the ledger sheet illustrated in Fig. 3.

The invention is shown applied to a Burroughs calculating machine, the general construction of which is so well known that it need not be described except very briefly.

The machine has suitable amount keys 10 on which items may be entered for receipt in a register or registers (not shown). A printing mechanism is provided which includes the type bars 11 illustrated in Fig. 1. The machine operates through a forward and a return stroke of movement and, in a motor driven machine, such as illustrated, such operation may be caused by depressing a motor bar 12 which causes a link 13 to move upwardly thereby causing the motor 14 to give the machine a stroke of operation. Printing takes place at the end of the forward stroke of the machine after the type bars are indexed.

A laterally movable paper carriage 15 is mounted at the rear of the machine, said carriage supporting a rotatable platen 16 around which papers may be introduced from the rear. The carriage is tabulated across the machine from column to column and than automatically returned, the tabulation occurring near the end of the return stroke of the machine. This mechanism is disclosed in Rinsche Patent No. 1,580,534.

A suitable ribbon mechanism is provided including an ink ribbon 17 (Fig. 2) which travels from one of the ink spools 18 to the other and vice versa, the ribbon being interposed between the type bars 11 and the platen 16 to make impressions on the paper around the platen.

Each time the machine is operated a shaft 20 (Fig. 1) is first rocked clockwise and then returned counterclockwise. This shaft carries a cam plate 21 having a slot engaging a stud 22 on a lever 23 pivoted at 24, the shape of the slot being such that, as the shaft 20 is rocked, the cam first rocks the lever 23 clockwise and then returns it counterclockwise. The rear end of lever 23 extends through the back plate 25 of the machine and this end is bifurcated to engage a stud 26 on a slide 27 (Fig. 2) mounted on the back plate 25. Each time the machine is operated the slide 27 is first moved downwardly and then returned upward. This slide controls the columnar tabulation of the paper carriage across the machine by raising the usual carriage stops (not shown) above the stop block 28 to permit the carriage to move to the right as viewed in Fig. 2, after which the stops are lowered so that the next stop engages the stop block 28. Although the slide 27 moves downward during the forward stroke of the machine, the carriage tabulation does not take place until the latter part of the return stroke of the machine. The tabulation is normally limited to a single columnar move-

ment, although devices are provided for causing the carriage to move through more than one column if desired, such devices being shown, for example, in said Rinsche Patent 1,580,534.

The mechanism for holding and controlling a postal card is associated and combined with the above described machine as follows:

Positioned adjacent the platen 16 but independent thereof is a chute 30 (Fig. 1) fixed to the back plate 25 of the machine. This chute comprises two vertical supports 31 and 32 (Fig. 2) to which are attached front and back plates 33 and 34. The upper edges of these plates are curved outwardly (Fig. 1) to facilitate the insertion of a postal card 35 and each plate has an opening such as the opening 36 shown in Fig. 2 in plate 34 so that printing impressions may be made on the card and duplicated on the papers to the rear of the card. The machine back plate 25 serves as a guide for the lower portion of the card 35 and a second plate 37 (Fig. 1) is attached to the inside of back plate 25 to hold and guide the lower end of the card.

The card is line spaced vertically independently of the platen by a mechanism which includes a slide plate 40 (Fig. 2) mounted on studs 41 and 42 on the back plate 25, the slide being provided with a lateral projection 43 extending into a slot 44 in the back plate 25 and under the lower edge of the postal card. The slide 40 is urged downward by a spring 45 connected at one end to a stud on the slide and at its other end to a stud on the back plate. One edge of the slide is provided with teeth 46 with which meshes a pinion 47 journaled loosely on a shaft 48 fixed in the back plate 25 of the machine. This shaft also carries a ratchet pinion 49 integral with pinion 47 with which cooperates a pawl 50 pivoted at 51 to an extension 52 on the slide 27. The pawl 50 is urged clockwise as viewed in Fig. 2 by a spring 53 against a limit stud 54 on the back plate 25.

When the slide 27 is in its normal upper position the pawl 50 occupies the position of Fig. 2. As the slide 27 moves downward during the forward stroke of the machine the pawl 50 moves into engagement with one of the teeth of the ratchet pinion 49 and moves pinion one step which raises the slide 40 one step and line spaces the postal card 35 one step upward. The slide 40 is held in the position to which it is moved by a detent 54 cooperating with teeth 55 on the slide 40, the detent being urged clockwise as viewed in Fig. 2 by a spring 56.

Each time the slide 27 is moved downward, the ratchet pinion 49 is rotated through one tooth space and the slide 40 is moved upwardly a line space distance where it is held by the detent 54. It is to be noted that, inasmuch as the slide 27 controls the columnar tabulation of the carriage, each time the carriage is tabulated laterally the card 35 is line spaced vertically.

After the proper number of entries have been made on the card the line space mechanism for the card must be returned to normal. This is done automatically through a carriage control comprising a cam slide 60 on the carriage rod 61. When the carriage moves from its columnar position corresponding to the last entry, the cam 60 engages detent 54 and releases it whereupon the slide 40 is returned to normal by its spring 45. In other words, the machine is arranged so that when the last entry is made on the postal card the line spacing mechanism for the card is automatically returned to normal so that another card can be put in the chute without requiring any adjustment of the machine.

Operation

The operation of the machine will be more clearly understood by following through an example of work.

The operator first places a ledger or other record sheet 70 (Fig. 1) about the platen 16 together with a piece of carbonized paper 71, the latter being not quite as wide as the record sheet in the example illustrated, as will be seen by referring to Fig. 3 where it will be observed that the carbon 71 does not extend over the right hand column of the record sheet 70.

The record sheet and carbon paper having been placed in position, the operator then inserts a postal card 35 in the chute 30. The first entry is then made on the amount keys and this entry, for public utility bill, is the "date" and "present meter reading" which, in the example illustrated, is 3300. The machine is then given a stroke of operation whereupon the date "Feb. 12" and the meter reading 3300 are printed on the card at the place indicated in Fig. 4 and, at the same time, they are duplicated on the record sheet in the column indicated in Fig. 2. The number 3300 is also accumulated additively in one of the registers of the machine. During the latter part of the machine operation the carriage tabulates laterally but this does not carry the card laterally as it is in the stationary chute 30.

The next entry is the "previous meter reading" which, in the example illustrated, is 2950. This amount is entered on the amount keys and the machine given a stroke of operation. During the forward stroke the card 35 is line spaced upwardly one step so that, when the printing mechanism operates, 2950 is printed on the card immediately below the 3300 as shown in Fig. 4. At the same time, 2950 is duplicated on the record sheet in the column illustrated in Fig. 3. This amount is entered subtractively in the register so as to be subtracted from the previous amount. During the latter part of the operation the paper carriage tabulates to another column but no lateral movement of the card occurs.

It is next desired to record the number of "cubic feet used" by customers. Accordingly, a total is taken from the register. During the forward stroke of the machine the card 35 is line spaced upwardly another step so that the difference between the first and second readings, namely, 350 cubic feet, is printed on the line shown in Fig. 4 and, at the same time, duplicated on the record sheet in the column indicated in Fig. 3. It is to be noted that the entries on the card are in logical position for subtraction which makes the customer's bill easier to read and understand. The paper carriage again tabulates a column to the left during the latter part of the machine operation described.

The next entry is the "gross" and the "net" amounts of the customer's bill. These are obtained by the operator from a chart or table showing gross and net amounts for all different quantities of gas consumed. The operator knows that, for 350 cubic feet of gas used, the gross amount of the bill is $6.34 and the net amount $6.04. He enters both of these amounts on the amount keys, one amount being entered on a group of keys at the left and the other on a group of keys at the right of the keyboard. The machine is then given a stroke of operation whereupon the card 35 is first line spaced upwardly after which both

amounts are printed on the line indicated in Fig. 4 and at the same time reproduced on the record sheet in the column indicated in Fig. 3. These amounts are accumulated additively in the register, each amount being in a different section of the register so that the gross and net accumulations will be independent of each other.

The next entry is of an "unpaid balance" of $2.60. This is entered on both sides of the machine, that is, on the left hand and on the right hand groups of keys but, when the machine is operated, the printing mechanism for the left hand section is blocked so that the amount $2.60 is printed only at the right hand side of the card on the line indicated in Fig. 4, this amount being, at the same time, duplicated on the record sheet in the column indicated in Fig. 3. This amount is added in both sections of the register.

The next entry is a "merchandise charge" of $3.30. Here, again, the card is line spaced upward and the amount of $3.30 is entered in both groups of keys and added in both the right and left hand sections of the register but, when printing occurs, the printing mechanism is blocked in the left hand section so that the $3.30 is printed only on the right hand side of the card as indicated in Fig. 4 and reproduced at the same time on the record sheet in the column indicated in Fig. 3.

The next operation is to get the "gross" and "net" amounts of the bill. This is done by taking a subtotal from the machine. As the machine is operated to take a subtotal, the card 35 is line spaced upwardly one step after which the subtotal is taken from both the right and the left hand sections of the register. This prints the subtotals, the amount $12.24 being in the left hand column and the amount $11.94 in the right hand column. These amounts are, at the same time, duplicated on the record sheet in the column indicated in Fig. 3. The amounts also remain in the register.

The next operation is to enter the "account number" of the customer. The account number, in the example illustrated, is 121. This is entered on the amount keys and printed, but the registers are non-added while this is done so that the printing of the account number will not disturb the condition of the registers. This account number is printed at the place indicated in Fig. 4 and, at the same time, is duplicated on the record sheet in the column indicated in Fig. 3.

The next operation is to again print the gross and the net amount of the bill. This is done by taking a total from both sections of the register. As the machine operates the card 35 is line spaced upwardly another step after which the gross amount $12.24 and the net amount $11.94 are printed on the line indicated on the postal card in Fig. 4. These amounts are not duplicated on the record sheet because there is no carbon under the postal card at this point.

The postal card is then removed after which it may be addressed and sent to the customer. As the paper carriage moves from its last columnar position, the cam 60 releases the detent 54 of the line spacing mechanism for the postal card which thereupon returns to normal. The paper carriage is automatically returned across the machine by the well-known mechanism described in Rinsche Patent No. 1,580,534. The machine is then in condition for receiving another postal card.

It will thus be seen that a public utility customer's bill can be quickly and easily made out on a postal card with the items in such position as to be more easily understandable to the customer than if they were strung out in a horizontal line as they are on the ledger sheet. At the same time the public utility company can keep its record in a horizontal line on the usual form of ledger or record sheet without the waste of so much space as would occur if the account were made out in a vertical position as it is on the postal card.

The postal card is usually provided with a line or a weakened portion 72 along which, when the bill is paid, the card is torn off, receipted, and returned to the customer. The blank space at the top of the card shown in Fig. 4 is generally used for information or instructions.

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 machine of the class described having a general operating means adapted to be given a cycle of operation, a printing mechanism, a laterally movable paper carriage supporting a platen, means for holding a record sheet about said platen in feeding relation thereto, front-feed means constructed to readily receive a front-fed work sheet and support it in printing position in front of but out of feeding contact with said platen for a printing operation of said printing mechanism, and means acting automatically during a cycle of operation of said operating means to cause a relative vertical movement between said front-fed work sheet and said record sheet to thereby obtain a line space movement between said sheets and to cause a relative lateral movement between said platen and said front-feed means to thereby obtain a columnar spacing between said record sheet and work sheet.

2. A machine of the class described having a general operating means adapted to be given a cycle of operation, a printing mechanism, a laterally movable paper carriage having a platen, means for holding a record sheet about said platen in feeding relation thereto, a stationary front-feed means constructed to readily receive a front-fed work sheet and support it in printing position in front of but out of feeding contact with said platen for a printing operation of said printing mechanism, and means acting automatically during a cycle of operation of said operating means to line space said work sheet vertically relative to said platen and to move said platen laterally relative to said front-feed means.

3. A machine of the class described having a forward and return stroke of movement, a laterally movable paper carriage having a platen, means for holding a record sheet about said platen in feeding relation thereto, front-feed means constructed to readily receive a front-fed work sheet and support it in vertical position in front of but out of feeding contact with said platen for a printing operation of said printing mechanism, and means operating automatically to line space said work sheet vertically relative to said platen during the forward stroke of said machine and to move said platen laterally relative to said work sheet during the return stroke of said machine.

4. A machine of the class described having a general operating means adapted to be given a cycle of operation, a printing mechanism, a laterally movable paper carriage provided with a

platen, means for holding a record sheet and a carbon sheet about said platen in feeding relation thereto, means supporting an ink ribbon along the printing line of said platen between said printing mechanism and said platen, a stationary paper chute constructed to readily receive a front-fed work sheet and loosely support it in substantially vertical printing position in front of but out of feeding contact with said platen and between said ribbon and platen, said chute having openings therethrough to enable said printing mechanism, when it strikes said ribbon to cause duplicate impressions to be made on said record sheet by said carbon sheet, means automatically line spacing said work sheet vertically independent of said platen and record sheet during a cycle of operation of said operating means, and means automatically tabulating said carriage and platen laterally relative to said chute during said cycle of operation to move said record sheet from column to column horizontally relative to said work sheet.

5. A machine of the class described having a general operating means adapted to be given a cycle of operation, a printing mechanism, a laterally movable paper carriage provided with a platen, means for holding a record sheet and a carbon sheet about said platen in feeding relation thereto, stationary means constructed to receive a front-fed work sheet and support it in substantially vertical printing position in front of said platen while leaving said work sheet free to be removed at any time, said front-feed means engaging the bottom of said work sheet but leaving the top of said sheet free to be grasped by hand, said front-feed means also supporting the front and back sides of said work sheet around its bottom and side edges but leaving the center free to receive printing impressions and transmit them to the carbon and record sheet on said platen, means for automatically moving said work sheet vertically to line space it relative to said record sheet during a cycle of operation of said operating means, and means automatically tabulating said platen laterally during said cycle of operation to move the record sheet in a columnar direction relative to said work sheet.

6. A calculating machine having a laterally movable paper carriage provided with a platen, means for supporting a paper card in substantially vertical position adjacent said platen but independently thereof, means for tabulating said carriage across the machine, means for line spacing said card vertically from a normal position independently of said platen, and means for automatically returning said line spacing mechanism to normal when said carriage reaches a predetermined position.

7. A calculating machine having a laterally movable paper carriage provided with a platen, means for holding a paper card in substantially vertical position adjacent said platen but independent thereof, means for tabulating said carriage across the machine, and line spacing means for line spacing said card independently of said platen, said line spacing means being urged toward a normal position but being restrained from returning to normal during line spacing movements, and carriage controlled means for releasing said line spacing mechanism when said carriage reaches a predetermined position to thereby enable said line spacing means to return to normal.

8. A calculating machine having a laterally movable paper carriage provided with a platen, means for holding a paper card in substantially vertical position adjacent said platen but independent thereof, tabulating mechanism for tabulating said carriage across the machine, line spacing mechanism movable upward to move said card upwardly independent of said platen, said line spacing mechanism being urged downwardly, a detent for restraining said line spacing mechanism in its different line spaced positions, and carriage controlled means for releasing said detent to enable said line spacing mechanism to return to normal.

9. A calculating machine having a printing mechanism, a laterally movable paper carriage provided with a platen, a stationary chute for holding a card in substantially vertical position adjacent said platen but independent thereof, said chute having openings therethrough to permit said printing mechanism to strike said card and to enable impressions on said card to be transmitted to papers about said platen, tabulating mechanism for controlling the columnar tabulation of said carriage across the machine, a line spacing slide cooperating with the card in said chute, means operated by said tabulating mechanism for moving said slide upwardly, a spring urging said slide downwardly, a detent for restraining said slide in its different line spaced positions, and means carried by said paper carriage for releasing said detent to permit said slide to return to normal when said carriage reaches a predetermined position.

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