

Jan. 22, 1924.

1,481,487

O. J. SUNDSTRAND

ADDING AND LISTING MACHINE

Filed Aug. 15, 1921

4 Sheets-Sheet 1

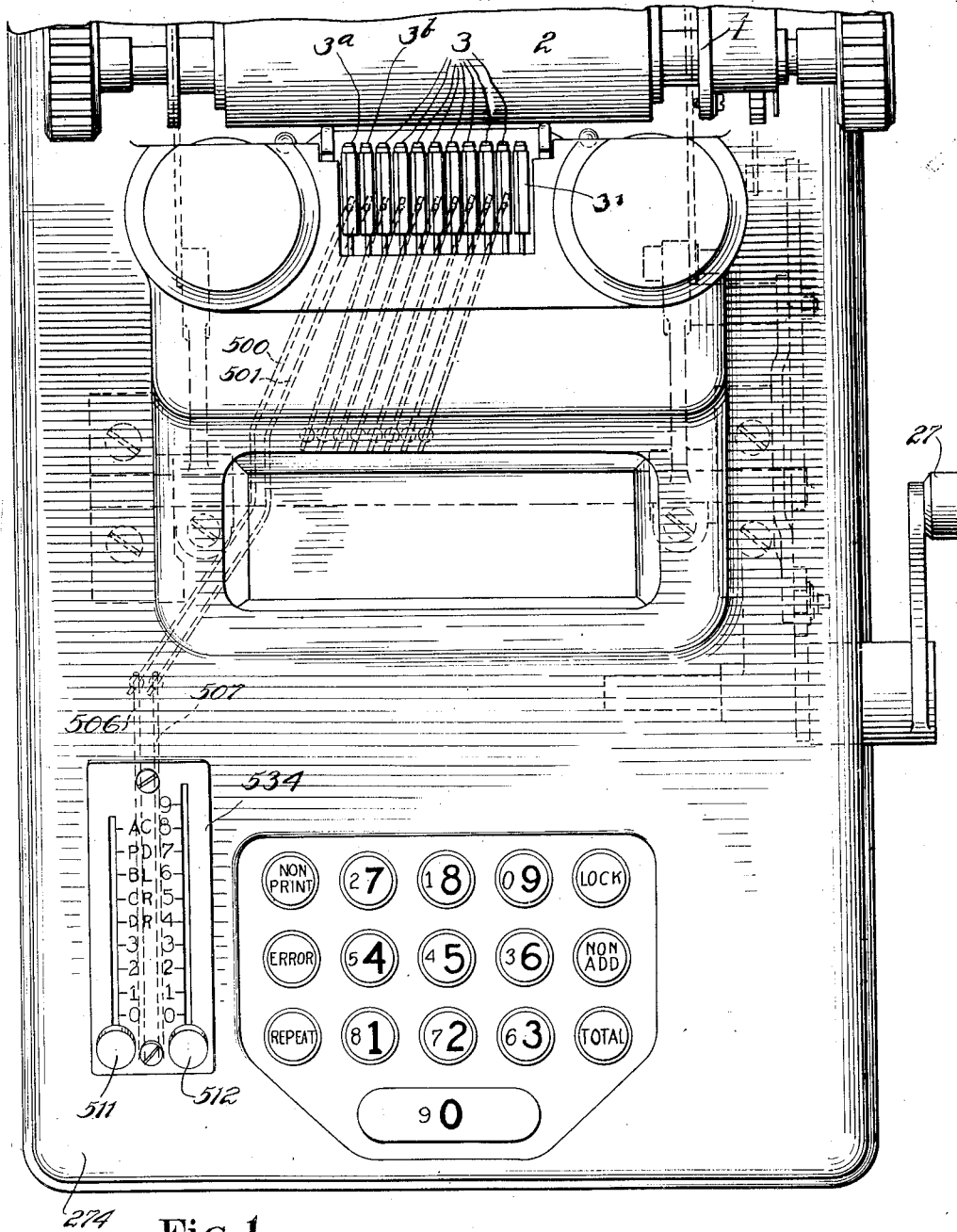


Fig. 1

Witness:
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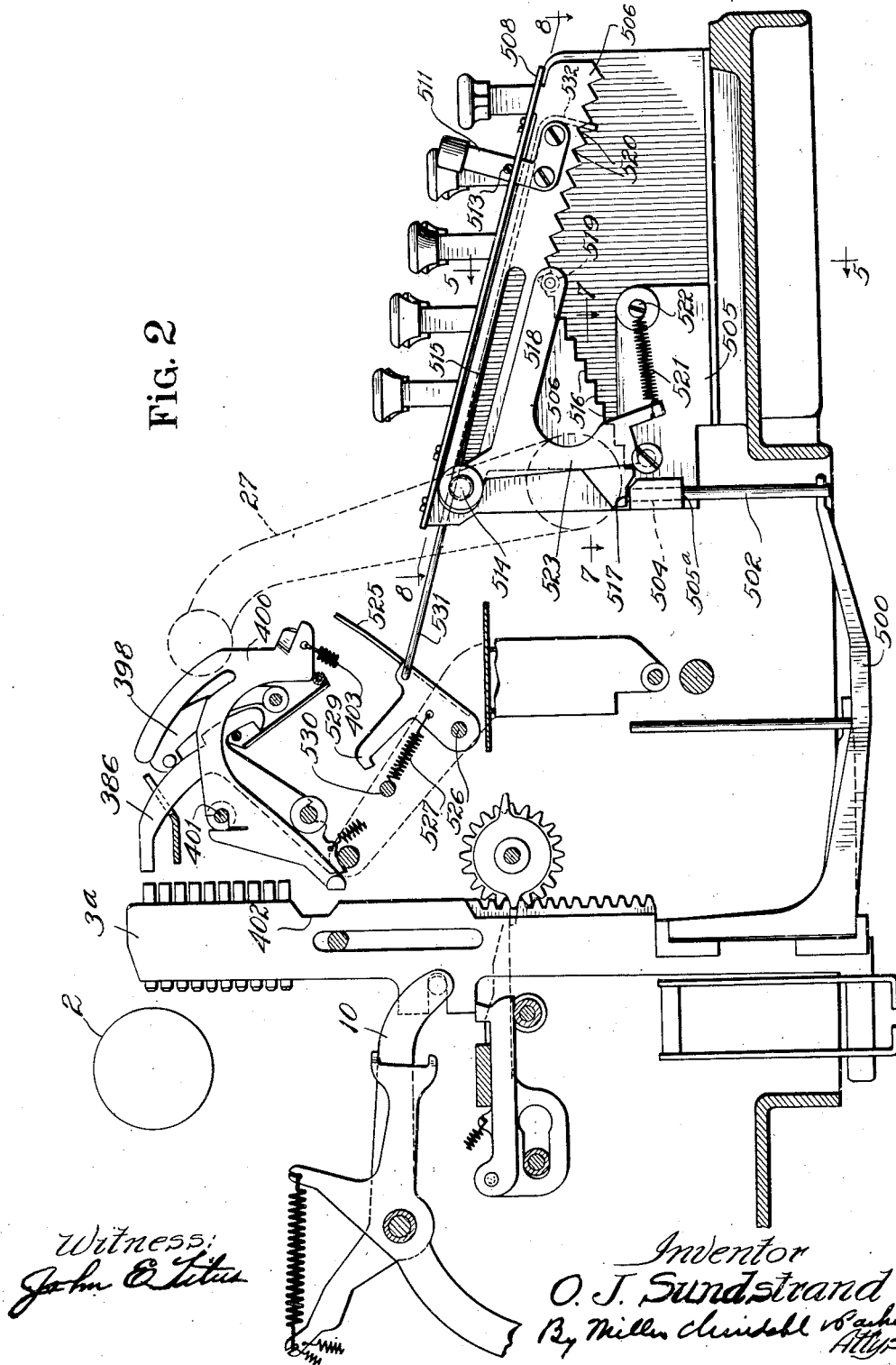
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4 Sheets-Sheet 2

Fig. 2



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Fig. 3

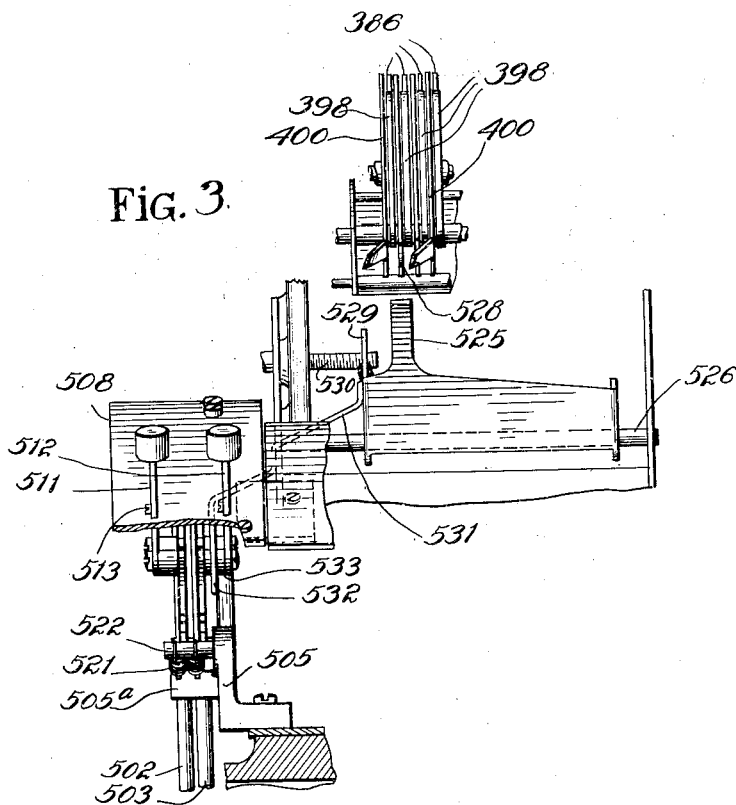


Fig. 5

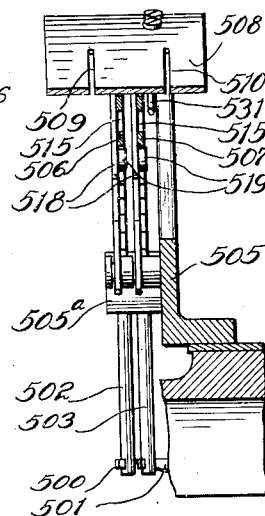
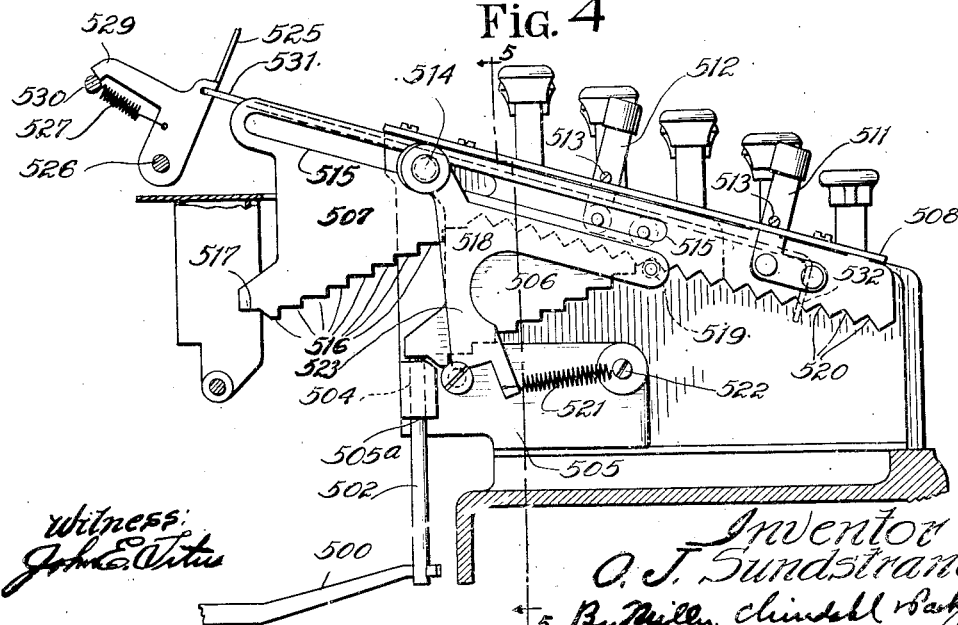


Fig. 4



Witness:
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Jan. 22, 1924.

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4 Sheets-Sheet 4

Fig. 6

MONTHLY STATEMENT			

10			
3	1.25		
6	2.25		
8	2.24		
9	.25		
10	1.25		
15	1.24		
19	22.52		
20	1.41		
30	25.25		
	57.66		
BAL	12.50		
	DR	70.16	
CR			
10	1.25		
2	12.25		
12			
	CR	13.75	
	BAL	56.41	

Fig. 7

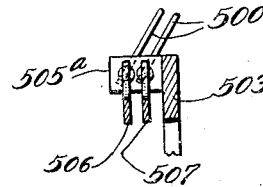
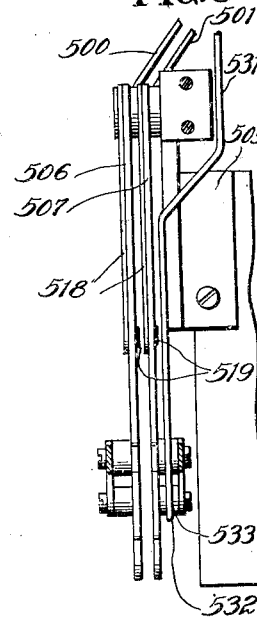


Fig. 8



Witness
 John E. Titus

Inventor
 O. J. Sundstrand
 By Miller Chisholm Barker
 Attys

UNITED STATES PATENT OFFICE.

OSCAR J. SUNDSTRAND, OF ROCKFORD, ILLINOIS, ASSIGNOR TO ROCKFORD MILLING MACHINE COMPANY, OF ROCKFORD, ILLINOIS, A CORPORATION OF ILLINOIS.

ADDING AND LISTING MACHINE.

Application filed August 15, 1921. Serial No. 492,241.

To all whom it may concern:

Be it known that I, OSCAR J. SUNDSTRAND, a citizen of the United States, residing at Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Adding and Listing Machines, of which the following is a specification.

The object of this invention, generally stated, is to provide means for printing such designations as are necessary in the preparation of a statement of account, as well as other characters, such as department numbers, clerk numbers, etc.

The invention will be herein disclosed in connection with a ten-key adding machine, although the invention is not limited to machines of this class.

In the accompanying drawings,

Fig. 1 is a fragmental plan view of an adding and listing machine embodying the features of my invention.

Fig. 2 is a fragmental, vertical, longitudinal sectional view through the machine.

Fig. 3 is a fragmental front elevation of certain of the parts directly related to the present invention.

Fig. 4 is a view similar to that of Fig. 2, but showing the parts in a different position.

Fig. 5 is a section on line 5—5 of Fig. 4.

Fig. 6 is a facsimile of a statement prepared upon the machine.

Fig. 7 is a section on line 7—7 of Fig. 2.

Fig. 8 is a section on line 8—8 of Fig. 2.

The present drawings illustrate the invention as embodied in a machine substantially similar to the one shown in the Sundstrand Patent No. 1,198,487, dated September 19, 1916, although it will be understood that the invention is capable of application to other forms of adding machines. Since the construction and mode of operation of the Sundstrand adding machine are well known, it will not be necessary to describe those parts of the present construction which are similar to those of the Sundstrand machine.

The means for supporting the sheet or tape upon which the printing is to be done may be of any suitable character. The Sundstrand adding machine is commonly provided with a paper carriage which is laterally adjustable in order that printing may be done in a plurality of columns. In

the present drawings, the numeral 1 may be assumed to indicate such a carriage, 2 being the platen. 3 are the vertically reciprocatory type bars for printing the items and totals, and 3' is the signal-printing type bar. At the left-hand side of the group of type bars 3 and 3' are two type bars 3^a and 3^b which are generally similar to the type bars 3 and are provided with the special characters which it is desired to print, as, for example, the numbers representing the months and the days of the month, and the abbreviations for debit, credit, balance, paid and account.

The means for vertically reciprocating the type bars 3, 3^a and 3^b may be of any desired nature, as, for example, that fully disclosed in said Sundstrand patent. Said means comprises levers 10, of which there is one for each of said type bars. 27 is the crank or handle by which the machine is caused to add and print the items set up by means of the key-board.

Like the type bars 3, the type bars 3^a and 3^b normally stand in position to present the uppermost type on each of said type bars at the printing line of the platen. The means for selectively limiting upward movement of the type bars 3^a and 3^b to present the desired characters at the printing line comprises arms 500 and 501, respectively, connected to the lower portions of said type bars and extending forwardly therefrom. To the forward ends of the arms 500 and 501 are attached upwardly extending pins 502 and 503, respectively, which are guided for vertical movement in guide openings 504 formed in a bracket 505 attached to the base of the machine. Means is provided for manually interposing stops in the path of upward movement of the pins 502 and 503. Herein said means comprises two plates 506 and 507 located in the vertical planes of the pins 502 and 503, respectively, and slidably mounted beneath a stationary guide plate 508. In said guide plate are slots 509 and 510 (Fig. 5) through which extend stems 511 and 512 provided with keys or heads for convenience in moving said stems through the slots. The stems 511 and 512 are rigidly attached to the forward portions of the plates 506 and 507, respectively. Screws or pins 513 extending through the stems 511 and 512 just above the plate 508 serve to prevent downward displacement of the for-

ward portions of the plates 506 and 507. The rear portions of the plates 506 and 507 are guided upon a stud 514 fixed in the bracket 505 and extending through slots 515 in said plates.

In order that the plane of movement of the stems 511 and 512 shall be approximately parallel with the adjacent surface of the enclosing casing 274, the plate 508 occupies an inclined position, as shown in Figs. 2 and 4.

The lower edge of the rear portion of each plate 506, 507 is stepped to provide stops to limit upward movement of the pins 502 and 503. These stops are sufficient in number to provide for positioning the desired number of characters. In the present instance the type bar 3^a carries nine type adapted to print "0", "1", "2", "3", "DR", "CR", "BL", "PD" and "AC", respectively, while the type bar 3^b is provided with ten type adapted to print the numerals from "0" to "9", respectively. For convenience in manufacture, the plates 506 and 507 may be identical in construction, each having nine stops 516 and a stop or dwell 517 corresponding to the initial or normal position of the stems 511 and 512. The means for limiting the upward movement of the type bar 3^b when "9" is to be printed, consists in this instance of the lower side of the bracket portion 505^a, the arm 501 stopping against said surface.

The means for yieldingly holding the plates 506 and 507 in adjusted position may partake of various forms. Herein are shown two latches or detents 518 pivoted on the stud 514 and having roller studs 519 that engage V-shaped notches 520 in the lower edges of the plates 506 and 507. The roller studs 519 are pressed against the notched lower edges of the plates 506 and 507 by coiled contractile springs 521 anchored at 522 and attached to arms 523 on the detents.

The hammer mechanism associated with the type bars 3, 3', 3^a and 3^b may be of any suitable construction. The hammer mechanism herein shown is similar to that embodied in the Sundstrand adding machine. Reference may be made to my application Serial No. 434,242, filed December 31, 1920, for a disclosure of the hammer mechanism of the Sundstrand machine. In the present drawings, 386 are the hammers, 398 are hammer-restraining latches, and 400 are controlling levers for disengaging the latches 398 from those hammers which are required to print. The inner or rear end of each lever 400 is adapted to enter a notch 402 formed in its respective type bar. A coiled contractile spring 403 tends to turn the lever 400 upon its pivot 401 to place the inner end of the lever in the notch 402 or in contact with the edge of the type bar below said notch. Those levers which enter the notches 402 re-

strain their respective hammers so that no printing is effected by the corresponding type bars. In the case of those type bars which have been raised so that the corresponding levers 400 stop against the edges of the type bars below the notches 402, the hammers are released and printing is effected.

The type bar 3^b is normally in position for printing a cipher. Since this type bar has no upward movement when a cipher is to be printed, special means must be provided to prevent the corresponding lever 400 from entering the notch 402 when a cipher is to be printed. The means herein shown for this purpose comprises a stop finger 525 pivoted on the rod 526. A coiled contractile spring 527 tends to swing the stop finger into place beneath a lug 528 on the controlling lever 400 associated with the type bar 3^b. A lug 529 on the stop finger 525 is then in contact with a stationary part 530. The means for holding the stop finger 525 out of operative position when the type bar 3^b is not required to print comprises a wire or rod 531 pivoted to said stop finger and extending forwardly beneath the plate 508. The forward end portion of the rod 531 is bent or hooked, as indicated at 532, for engagement by a member 533 attached to the stop plate 507. Said member may conveniently be one of the screws by which the stem 512 is secured to the plate 507, or a spacing sleeve surrounding said screw. When the stem 512 is in its initial position, the stop finger 525 is held forward out of the path of movement of the lug 528. When the stem 512 is moved into position for the printing of any of the characters represented by the type on the type bar 3^b, the spring 527 is permitted to move the stop finger 525 into position to limit downward movement of the controlling lever 400 corresponding to said type bar, and consequently the hammer for said type bar will be released at the proper time to drive the positioned type against the ribbon and paper.

As shown in Fig. 1, a plate 534 is attached to the casing 274 in position to overlie the plate 508. The casing 274 and the plate 534 have slots registering with the slots 509 and 510 so that the stems 511 and 512 may extend through the casing and the plate 534. Opposite the positions determined by the notches 520, the plate 534 is marked to denote the various characters that may be printed by means of the type bars 3^a and 3^b.

The stems 511 and 512 are located close to the keyboard and at the left-hand side thereof so that the operator may conveniently and rapidly place the stems 511 and 512 in the required positions.

The machine is provided with the mechanism ordinarily present in the Sundstrand

adding machine for enforcing a blank or spacing stroke of the handle 27 before a sub-total or a final total may be printed. The machine also is provided with the usual two-color ribbon mechanism whereby the totals are printed in a distinctive color, as, for example, red. Said two-color ribbon mechanism is so arranged that when the machine is clear and there is nothing set up on the keyboard, operation of the handle 27 causes the ribbon to be shifted into position for printing from the red field.

Fig. 6 is a facsimile of a statement of account prepared in the following manner. The machine being clear, the operator positions the stems 511 and 512 for the printing of the number indicating October, that is to say "10", and pulls the handle 27. Thereupon the number 10 is printed in red. (As hereinbefore explained, the hammer associated with the type bar 3^a was released by reason of the fact that the inner end of the corresponding lever 400 stopped against the edge of the type bar 3^a below the notch 402; and the hammer associated with the type bar 3^b was released because the stop finger 525 was in position to limit movement of the corresponding lever 400.) The operator then shifts the stems 511 and 512 to permit the printing of the dates in October shown on the statement, such shifting being effected in connection with the setting up of each of the several debit items shown. The October debits having been printed, the operator pulls the handle 27 twice, the sub-total "57.66" being automatically printed in red during the second operation of the handle. The operator then shifts the stem 511 into position for the printing of the abbreviation "BAL", sets up the amount "12.50" on the keyboard, presses the non-add key and pulls the handle 27, whereby the old balance is printed directly below the sub-total "57.66". The operator then shifts the paper carriage 1 to the left, puts the machine through a blank operation by pulling the handle 27, sets the stem 511 into position for the printing of the abbreviation "DR", depresses the total key and pulls the handle 27, whereupon the abbreviation "DR", the total "70.16" and the clear signal are printed in red. The operator then moves the paper carriage 1 to the right, places the stem 511 into position for the printing of the abbreviation "CR", causes the printing of said abbreviation by pulling the handle 27, places the stems 511 and 512 into position for the printing of the number "10" indicating the month of October, and again pulls the handle, whereby said number is printed in red. The operator then proceeds to print the amounts of the payments or other credits, together with the days of the month on which the credits were en-

tered. The operator then shifts the paper carriage 1 to the left, takes a blank or spacing stroke, sets the stem 511 into position for the printing of the abbreviation "CR", depresses the total key and pulls the handle 27, whereupon the abbreviation "CR", the total of the credits and the clear sign are printed in red, the credit total being in the same column as the debit total. The operator then performs the operation of subtracting the credit total from the debit total by the well known complementary method, sets the stem 511 in position for the printing of the abbreviation "BAL", depresses the total key, and pulls the handle 27, whereby said abbreviation, the balance "56.41" and the clear sign are printed in red.

I claim as my invention:

1. A ten-key adding machine having, in combination, a keyboard, a group of vertically reciprocatory type bars located rearwardly of the keyboard, each of the two type bars at the left-hand side of the group carrying special type which are useful in statement work, each of said special type bars having attached to its lower portion a forwardly extending arm, an upwardly extending pin connected to the forward end of each of said arms, said pins being guided for vertical movement, two vertically disposed plates arranged at the left-hand side of the keyboard for sliding movement forward and back above the upper ends of said pins, the lower edges of said plates being stepped to limit rising movement of the special type bars, a finger piece rigidly secured to each of said plates for sliding the latter, and means for yieldingly holding each plate in the position to which it has been slid.

2. A ten-key adding machine having, in combination, a keyboard, a group of vertically reciprocatory type bars located rearwardly of the keyboard, one of said type bars carrying special type which are useful in statement work, said special type bar having attached to its lower portion a forwardly extending arm, an upwardly extending pin connected to the forward end of said arm, said pin being guided for vertical movement, a vertically disposed plate guided at one side of the keyboard for sliding movement forward and back above the upper end of said pin, the lower edge of said plate being stepped to limit rising movement of said special type bars, a finger piece connected to said plate for sliding the latter, and means for yieldingly holding said plate in the position to which it has been slid.

3. A ten-key adding machine having, in combination, a group of vertically reciprocatory type bars, one of said type bars carrying special type which are useful in statement work, said special type bar having at-

tached to its lower portion a forwardly extending arm, an upwardly extending pin connected to the forward end of said arm, said pin being guided for vertical movement, a vertically-disposed plate arranged for longitudinal sliding movement above the upper end of said pin, the lower edge of said plate being stepped to limit rising movement of said special type bar, a finger piece connected to said plate for sliding the latter, and means for yieldingly holding said plate in the position to which it has been slid.

4. A recording machine having, in combination, a keyboard, a group of vertically reciprocatory type bars located rearwardly of the keyboard, one of said type bars carrying special type which are useful in statement work, said special type bar having attached to its lower portion a forwardly extending arm, an upwardly extending pin connected to the forward end of said arm, a stationary part in which said pin is guided for vertical movement, and manual means at one side of the keyboard for selectively limiting upwardly movement of said pin.

5. A recording machine having, in combination, a plurality of type bars, one of which is rectilinearly reciprocatory up and down and carries special type which are useful in statement work, said special type bar having attached to its lower portion a forwardly extending arm, an upwardly extending pin connected to the forward end of said arm, said pin being guided for vertical movement, a vertically disposed plate arranged for sliding movement above the upper end of said pin, the lower edges of said plates being stepped to limit rising movement of said pin, and manual means for sliding said plate.

6. An adding machine having, in combination, a type carrier having a plurality of type, a hammer for driving the type to print, a controlling lever for the hammer, a spring tending to move the lever into position to prevent effective movement of the hammer, a member arranged to restrain the spring, a manually-settable member having a plurality of stops to limit movement of the type-carrier, and an operating connection between said members.

7. An adding machine having, in combination, a type-carrier having a plurality of type, a hammer for driving the type to print, a controlling lever for the hammer, a spring tending to move the lever into position to prevent effective movement of the hammer, a member arranged to restrain the spring, a member to limit movement of the type-carrier, and manual means for operating both of said members.

8. An adding machine having, in combination, a type-carrier having a plurality

of type, a hammer for driving the type to print, a controlling lever for the hammer, a spring tending to move the lever into position to prevent effective movement of the hammer, a member arranged to restrain the spring, and manual means for operating said member.

9. An adding machine having, in combination, a type-carrier having a plurality of type, a hammer for driving the type to print, a controlling lever for the hammer, a spring tending to move the lever into position to prevent effective movement of the hammer, a member arranged to restrain the spring, a member to limit movement of the type-carrier, and a single means for operating said members.

10. A recording machine having, in combination, a vertically reciprocatory type bar, carrying special type which are useful in statement work, said special type bar having attached to its lower portion a forwardly extending arm, an upwardly extending pin connected to the forward end of said arm, said pin being guided for vertical movement, a vertically-disposed plate arranged for longitudinal sliding movement above the upper end of said pin, the lower edge of said plate being stepped to limit rising movement of said special type bar, a finger piece connected to said plate for sliding the latter, a hammer for driving said special type to print, means to control the hammer, and a link operatively connecting said controlling means to said plate.

11. A recording machine having, in combination, a vertically reciprocatory type bar carrying special type which are useful in statement work, manual means for selectively limiting rising movement of said type bar, a hammer for driving the type to print, means to control the hammer, and an operative connection between said controlling means and the manual means for limiting rising movement of the type bar.

12. A recording machine having, in combination, a vertically reciprocatory type bar carrying special type which are useful in statement work, manual means for selectively limiting rising movement of said type bar, said type bar having a notch therein, a hammer for driving the type to print, a controlling lever for the hammer, a spring tending to move the lever against the notched edge of said type bar, a member arranged to restrain the spring, and an operative connection between said member and the manual means for limiting rising movement of the type bar.

In testimony whereof, I have hereunto set my hand.

OSCAR J. SUNDSTRAND.