

April 26, 1949.

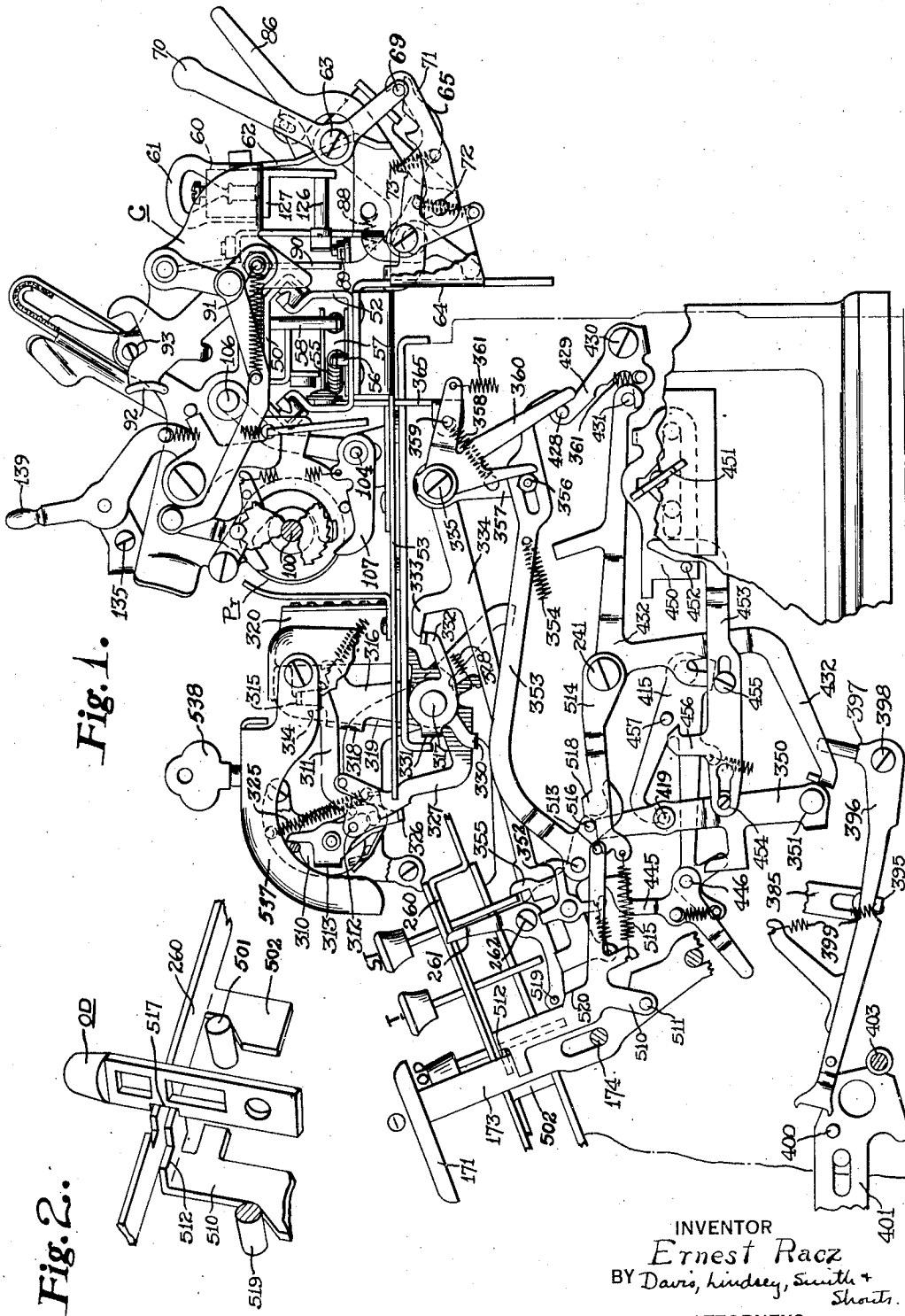
E. RACZ

2,468,408

CALCULATING MACHINE

Filed Sept. 3, 1941

15 Sheets-Sheet 1



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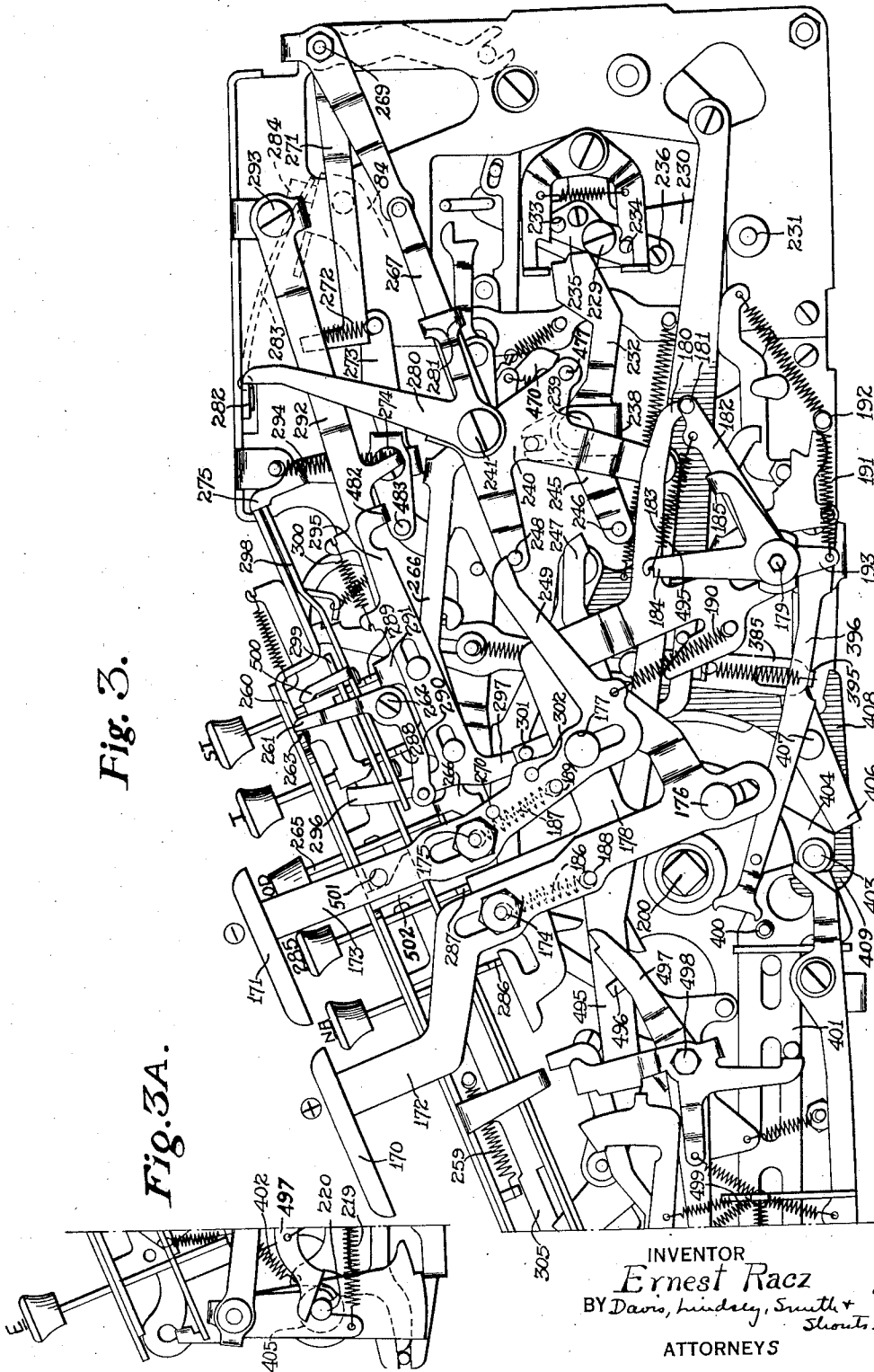


Fig. 3.

Fig. 3A.

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Fig. 5.

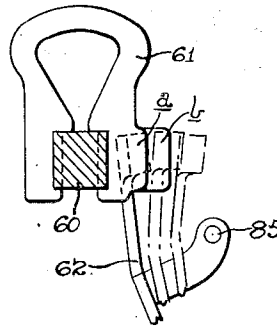
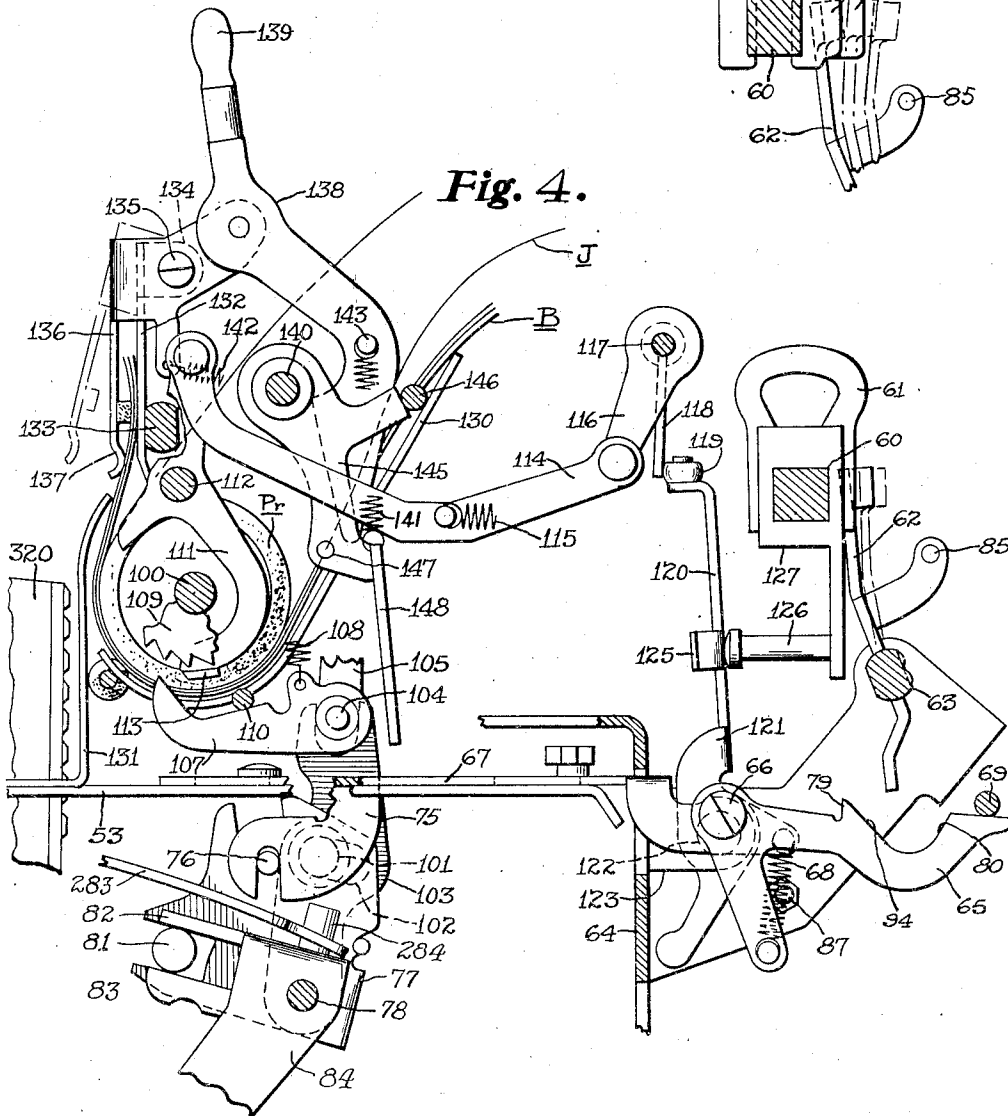


Fig. 4.



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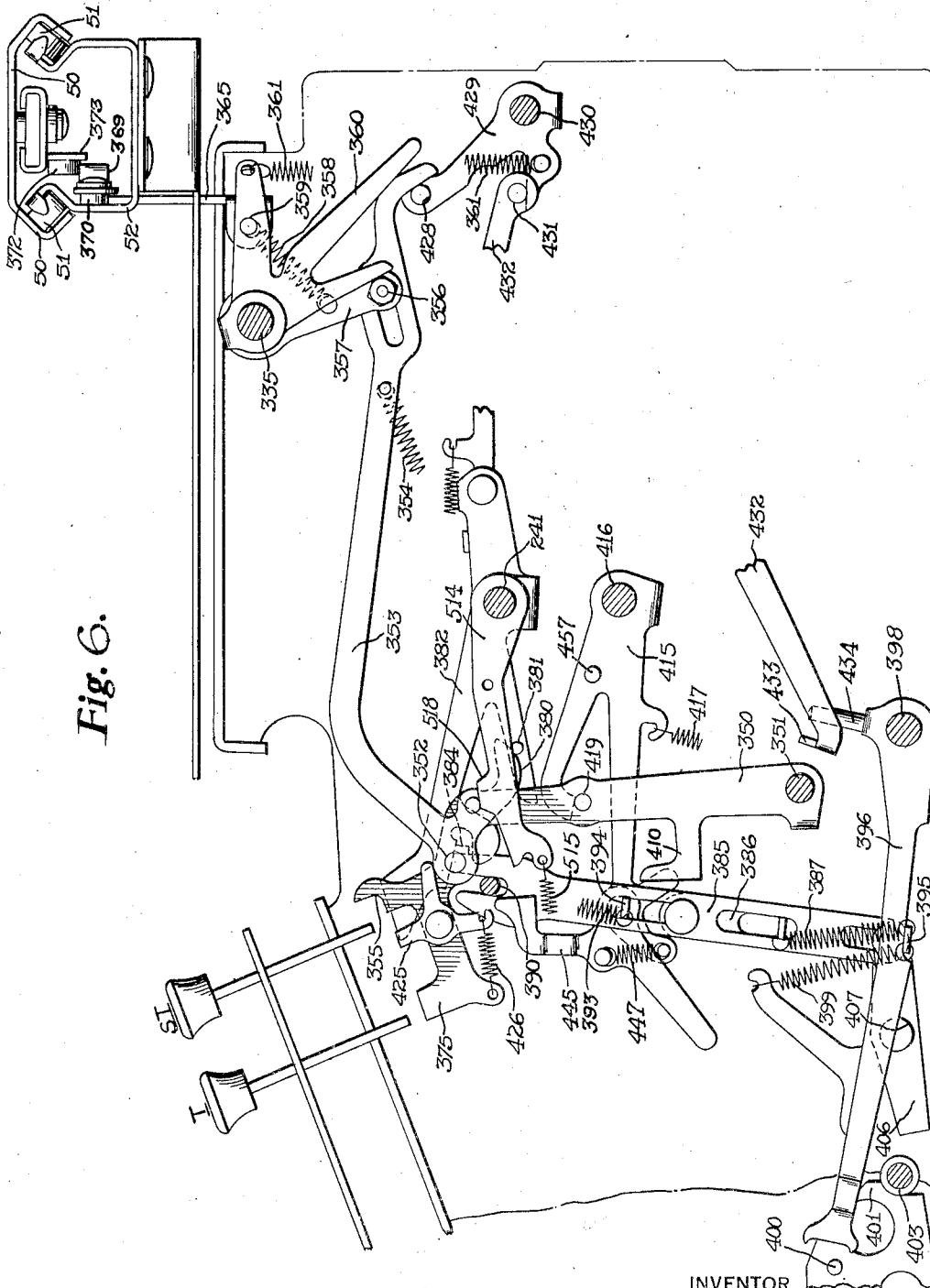
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Fig. 6.



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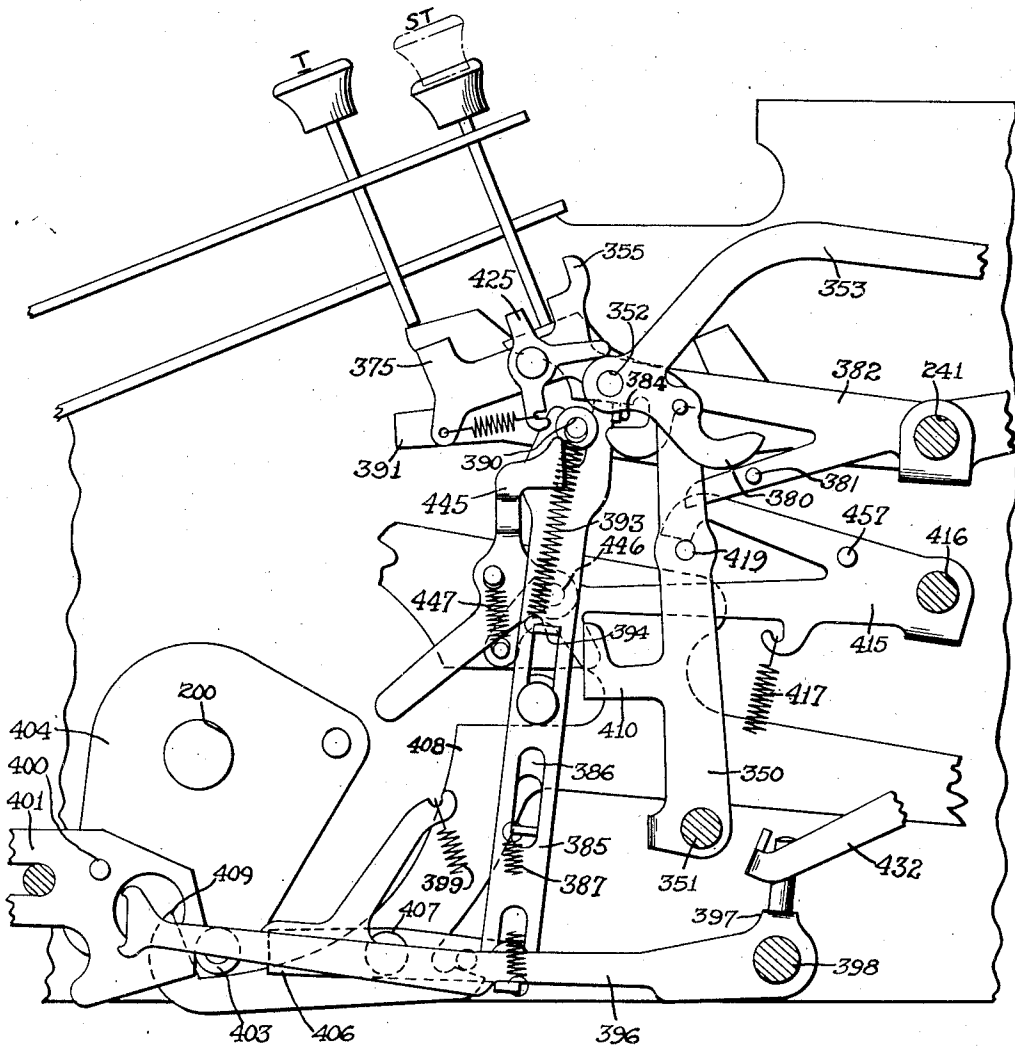
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Fig. 7.



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Fig. 8.

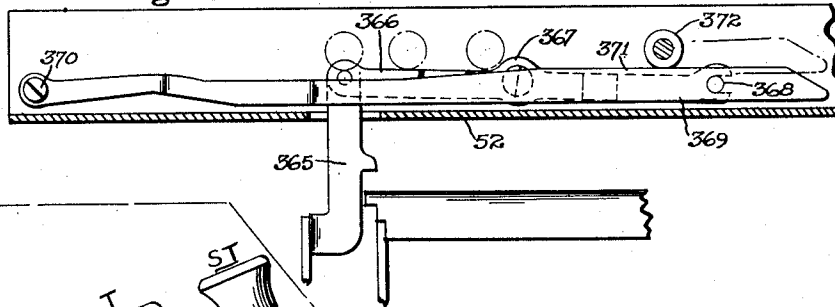
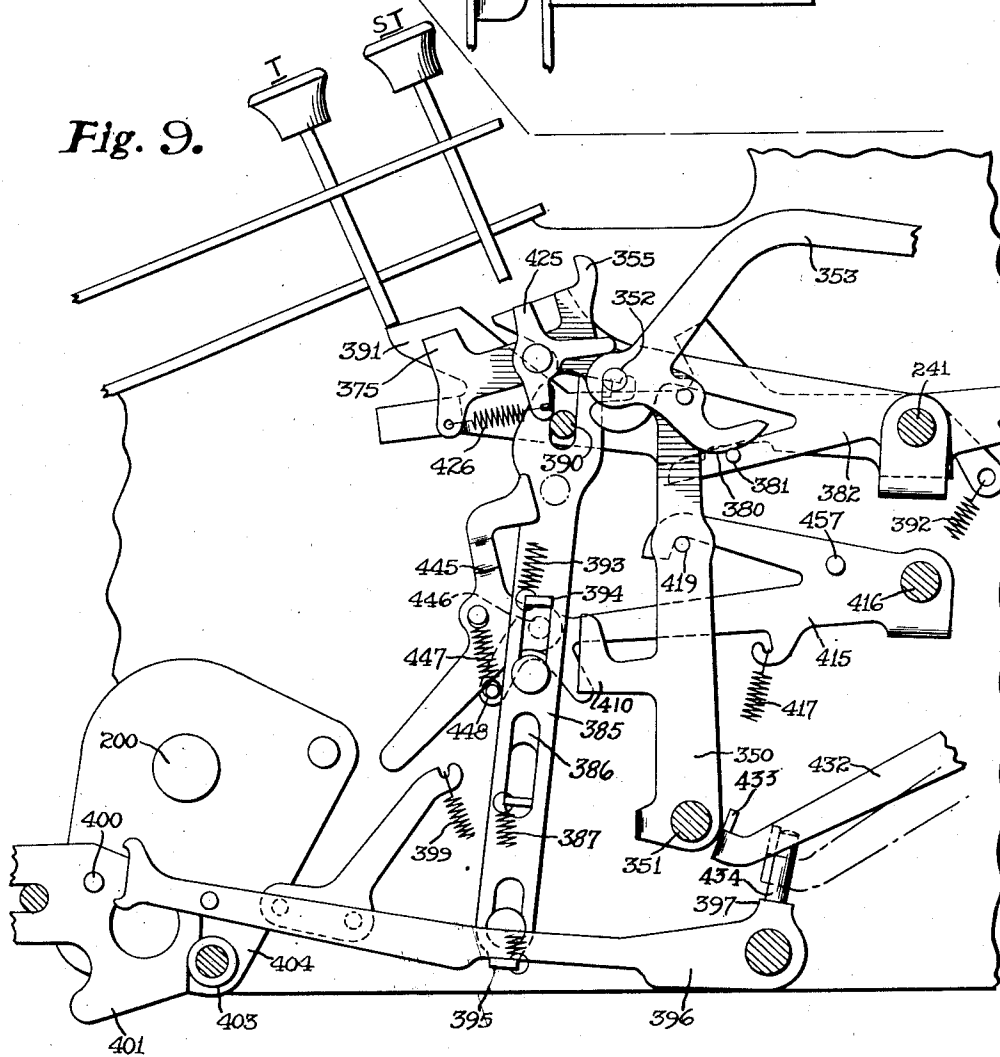


Fig. 9.



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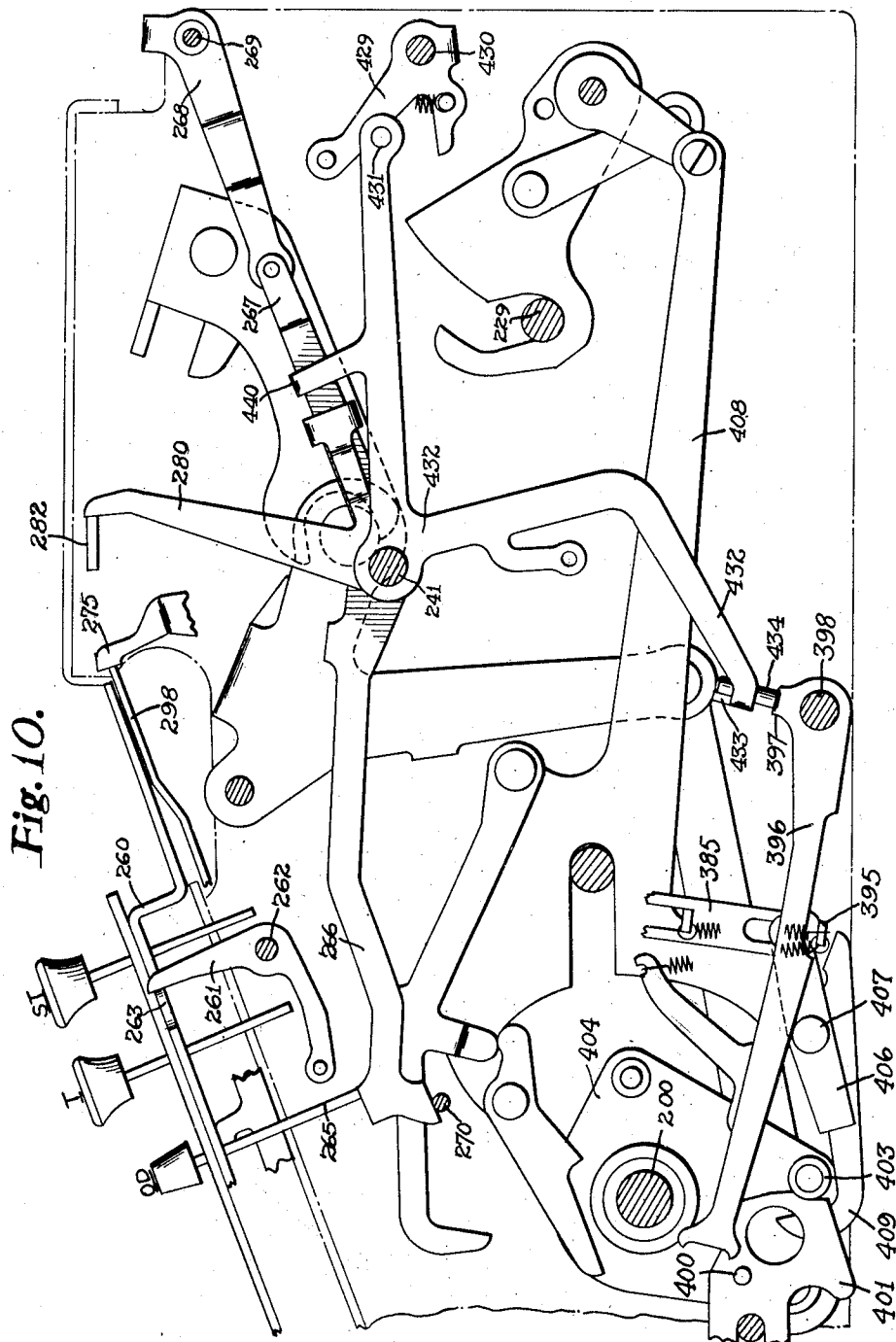
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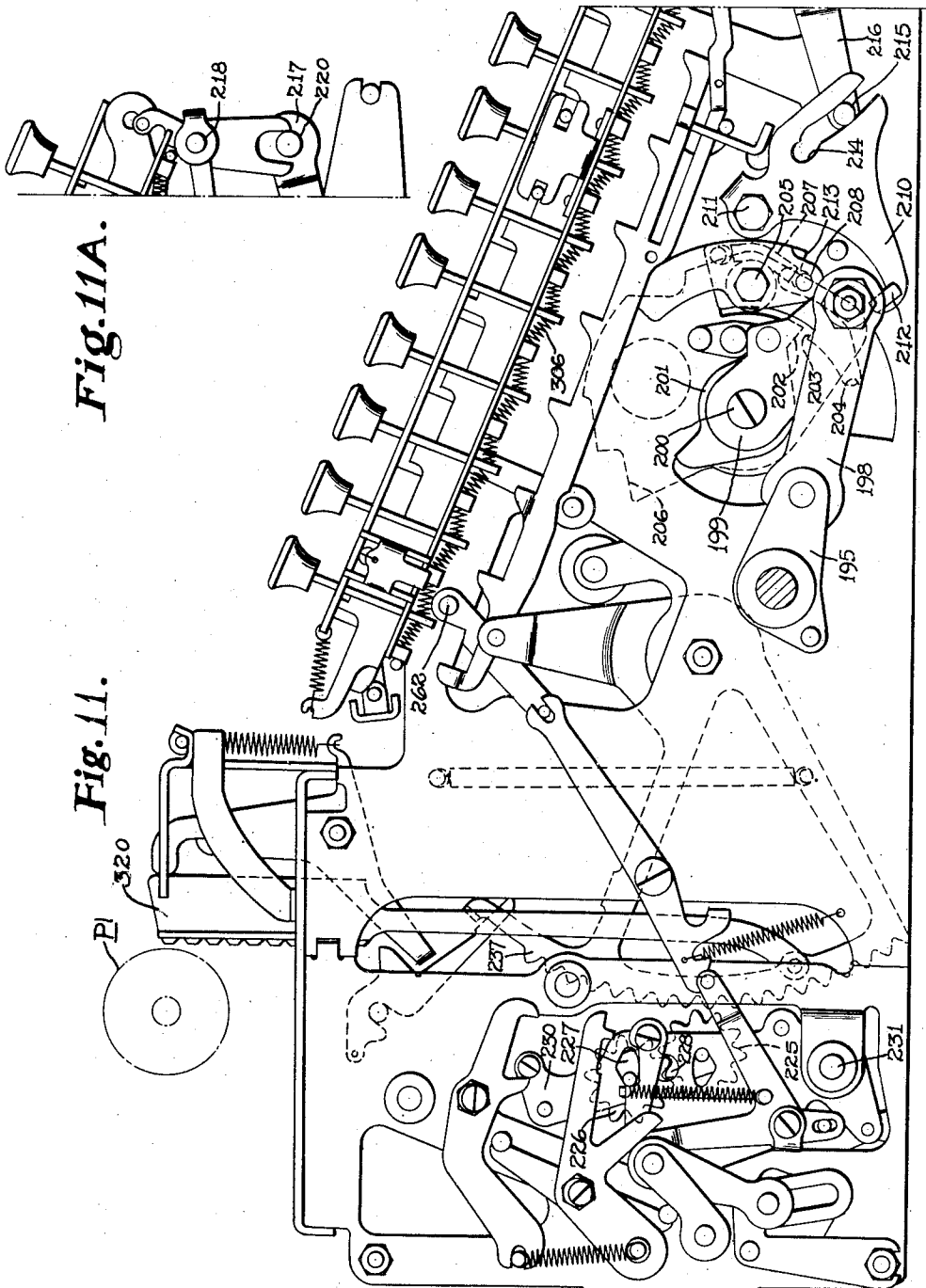
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Fig. 13.

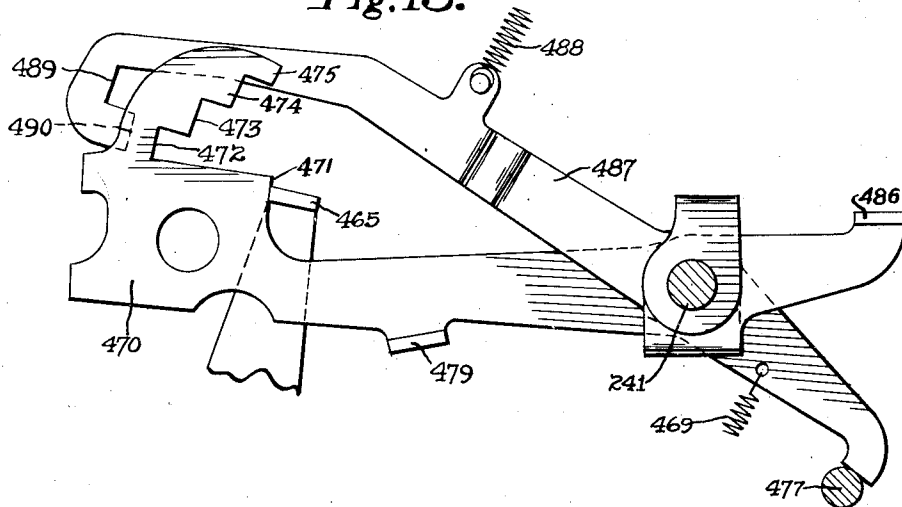


Fig. 12.

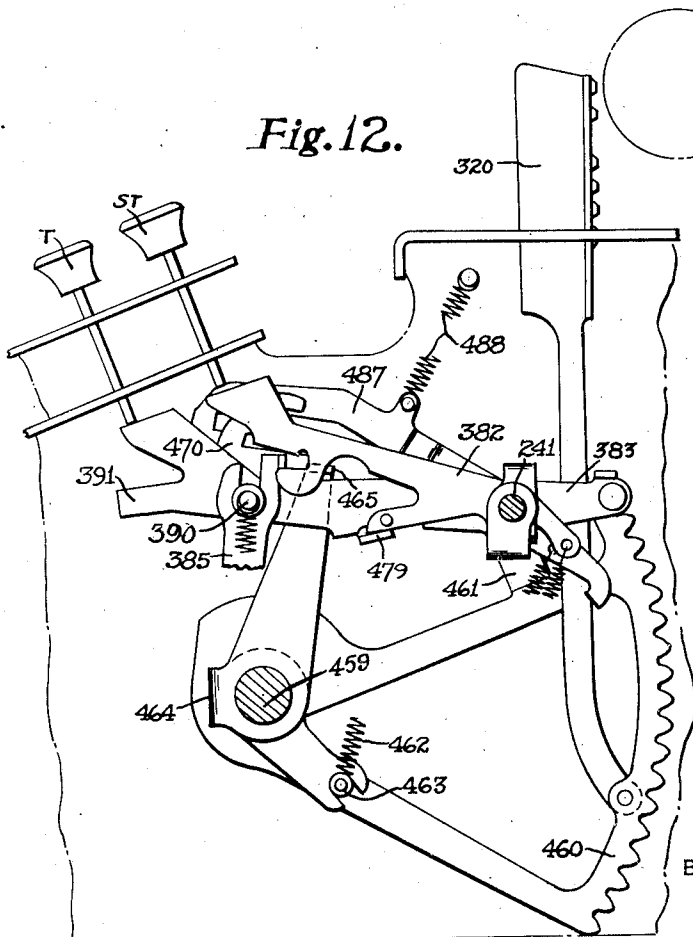
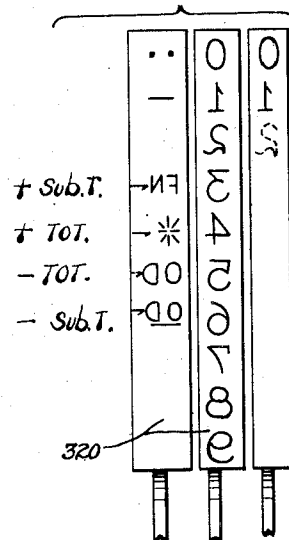


Fig. 14.



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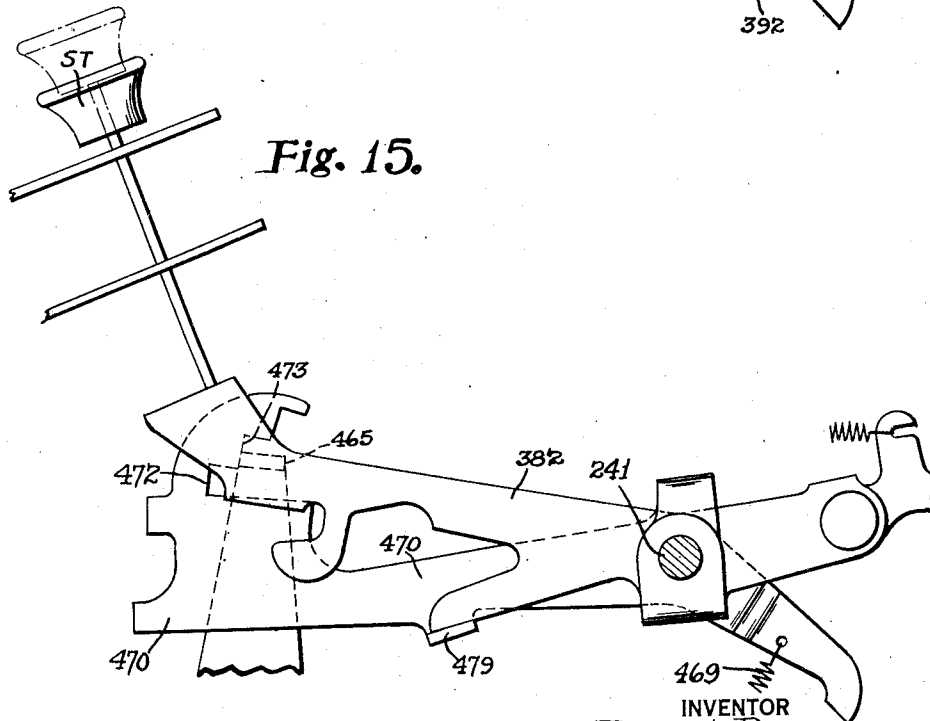
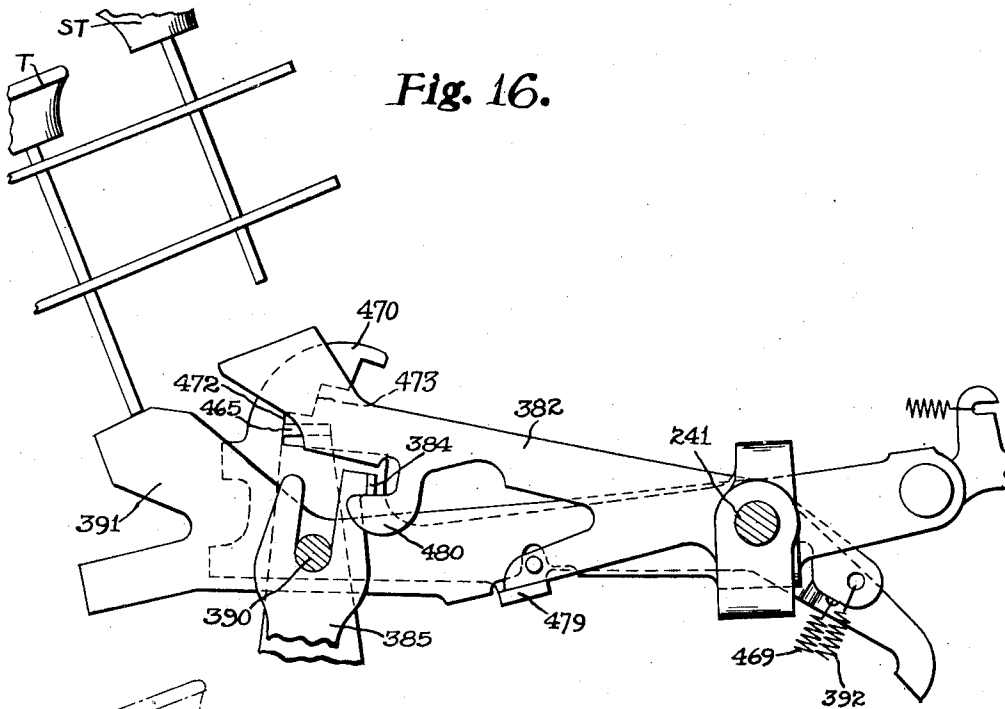
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Fig. 17.

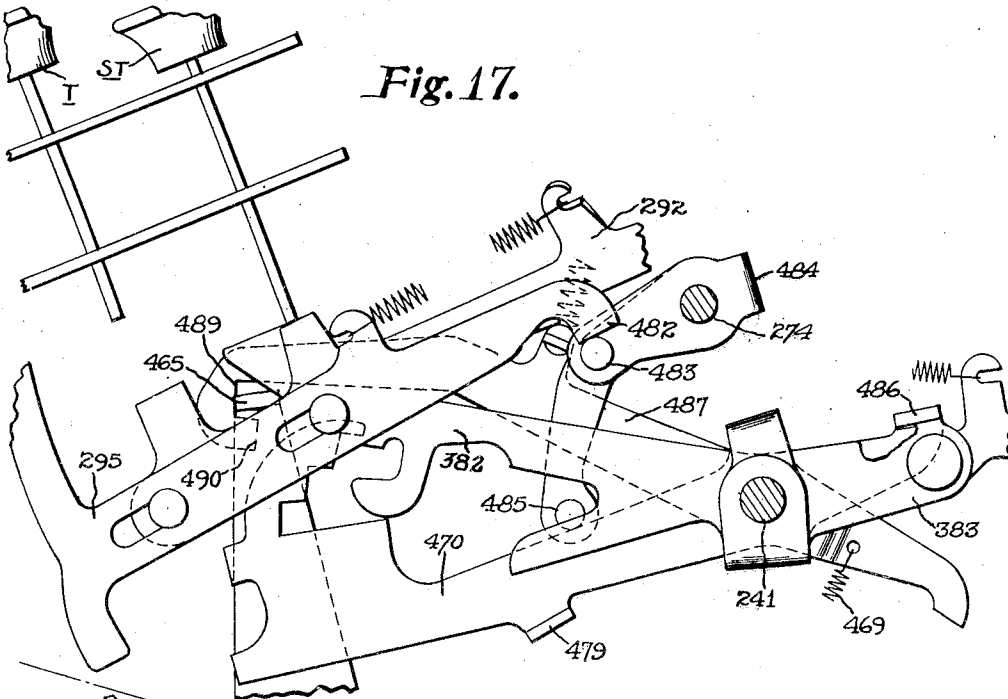
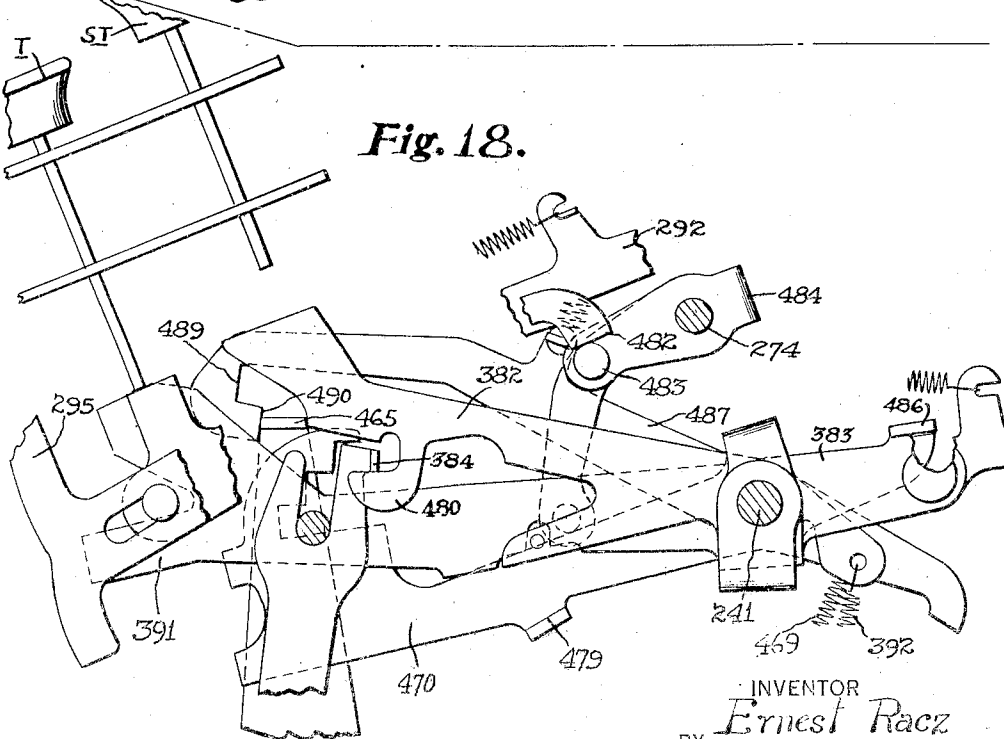


Fig. 18.



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Fig. 19.

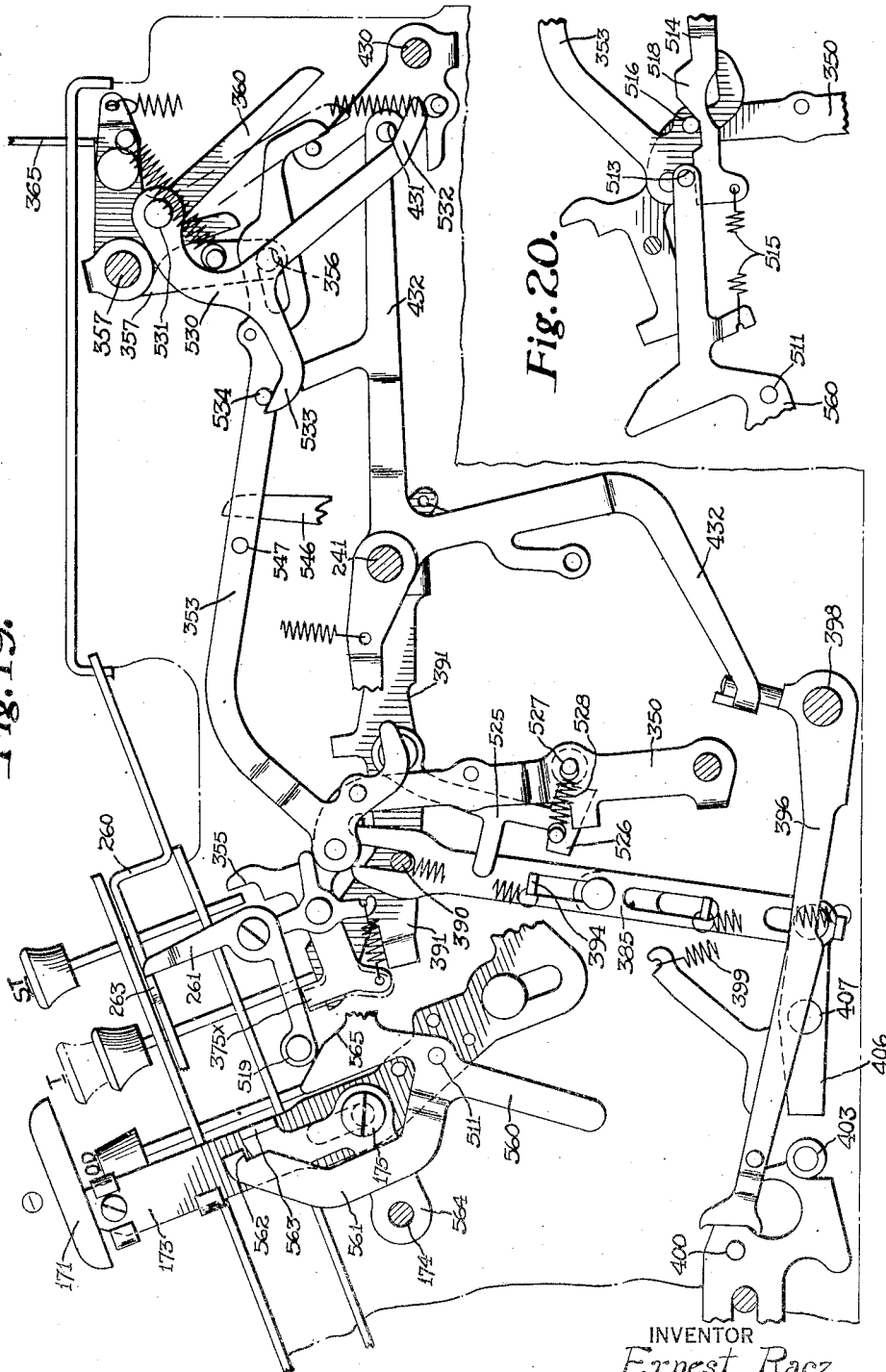
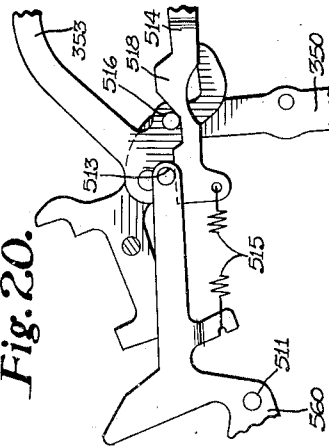


Fig. 20.



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Fig. 21.

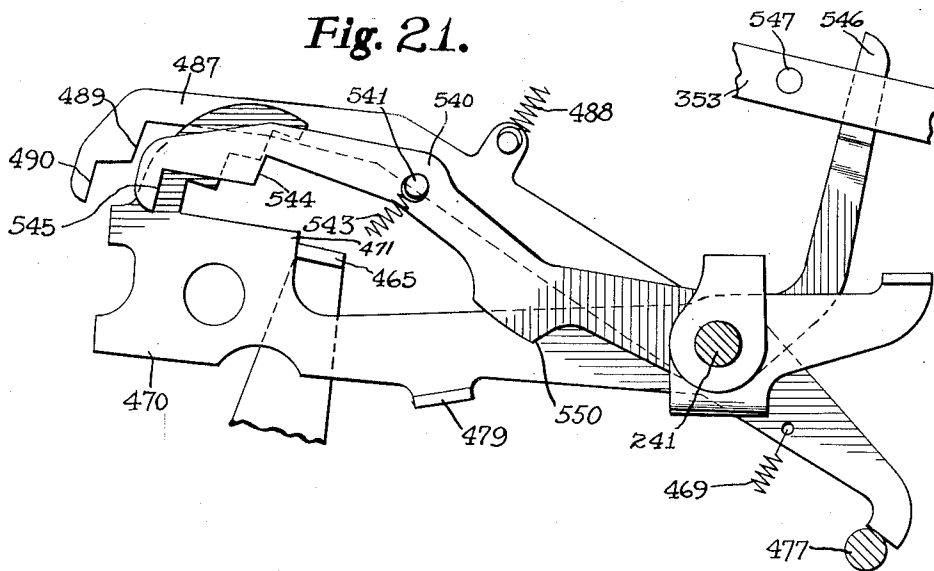
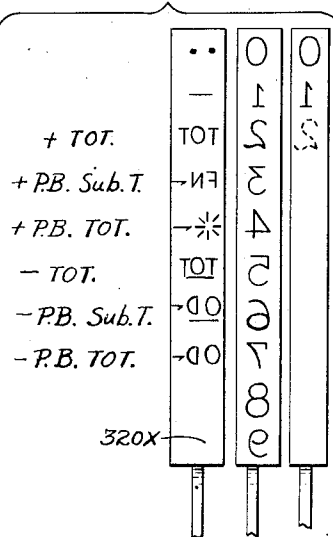


Fig. 22.



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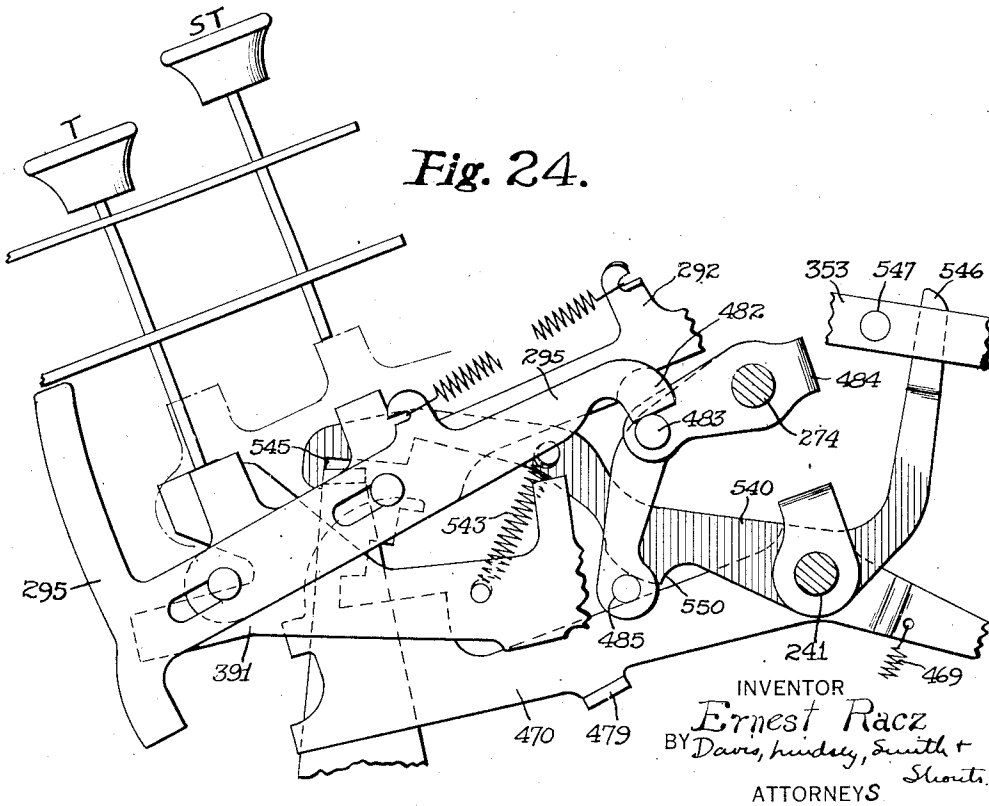
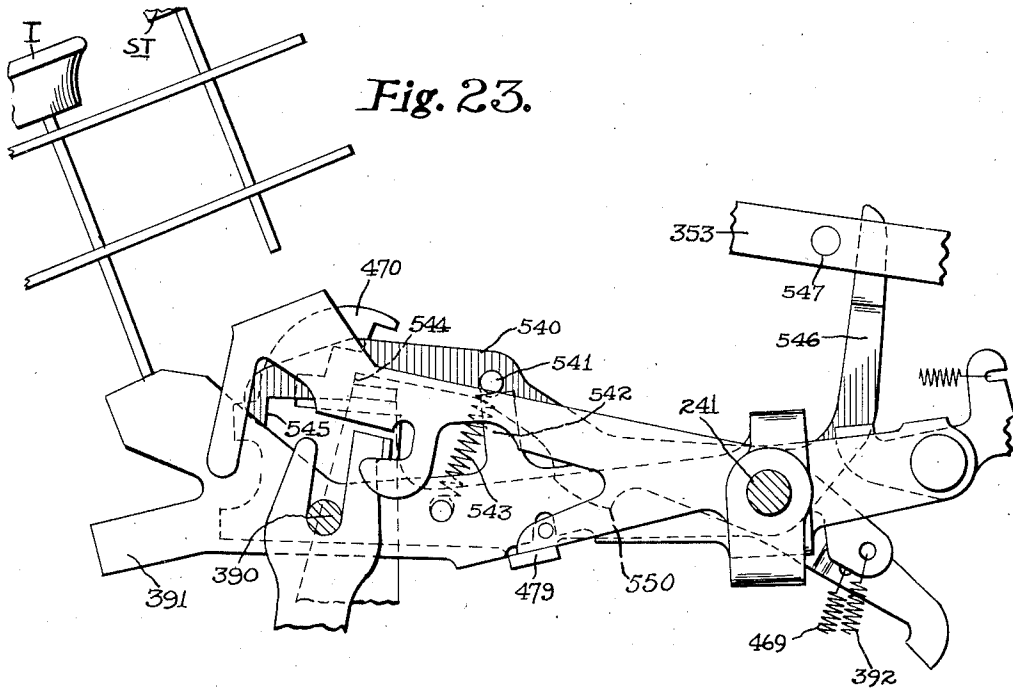
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Fig. 25.

JOURNAL			PASS-BOOK			
NEW BAL.	ACC. NO.	PICK UP	WITHDRAWAL	DEPOSIT	DATE	NEW BAL.
120.00 *-	185	100.00		20.00	Jun 10 41	120.00FN-
30.00 *-	268	75.00	45.00-		Jun 10 41	30.00FN-
50.00						
10.00						
5.00						
65.00 TOT						
180.00 *-	321	115.00		65.00	Jun 10 41	180.00FN-
75.00						
35.00						
150.00-						
40.00 TOT						
235.00 *-	224	275.00	40.00-		Jun 10 41	235.00FN-
25.00 0D-	215	50.00	75.00-		Jun 10 41	25.00 0D-
			</			

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UNITED STATES PATENT OFFICE

2,468,408

CALCULATING MACHINE

Ernest Racz, Detroit, Mich., assignor to Burroughs Adding Machine Company, Detroit, Mich., a corporation of Michigan

Application September 3, 1941, Serial No. 409,408

25 Claims. (Cl. 235—60.18)

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This invention relates to a calculating machine particularly adapted for posting entries in passbooks and the like.

An object of the invention is to provide an improved calculating machine which can be used for printing entries in passbooks and keeping a running record of work performed on the machine, and which is provided with means which will insure that improper or fraudulent entries cannot be made in the passbook or the like without revealing the fact to the proprietor of the machine or other person of supervisory authority.

A further object of the invention is to provide an improved machine for making passbook entries and a running record thereof, which machine may be used not only for posting passbook entries but may, between the making of passbook entries, be used as an ordinary calculating machine as, for example, for ordinary addition and/or subtraction. A further object is to provide a machine of the above-stated character which will automatically so differentiate the record of the ordinary calculating operations performed on the machine from the record of the passbook work performed by the machine as to clearly indicate, on the running record made by the machine, any improper or fraudulent passbook entry.

A further object of the invention is to provide a calculating machine with improved means to guard against errors, misoperations, and fraudulent operations.

A further object of the invention is to provide a calculating machine with improved means facilitating the posting of passbook entries.

Two embodiments of the invention are illustrated in the accompanying drawings in which:

Figure 1 is a right-hand side elevation of a calculating machine with the invention applied thereto, various parts being broken away to illustrate more clearly parts with which the invention is concerned;

Fig. 2 is a detailed perspective of certain of the parts shown in Fig. 1;

Figs. 3 and 3A are a right-hand side elevation of the machine with the casing removed and certain parts omitted to show more particularly the drive control means and certain other parts with which the invention is more particularly concerned;

Fig. 4 is a right side elevation of the paper carriage with certain parts omitted or broken away to show more particularly the passbook holding means, the line spacing means, and the columnar tabulating means;

Fig. 5 is a detail of a portion of Fig. 4;

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Fig. 6 is a right side view of some elements of the machine in the positions they occupy when the paper carriage is positioned for the printing of a debit or credit entry in a passbook;

Fig. 7 is a right side elevation of certain of the parts illustrated in Fig. 6, but showing the positions of the parts as the machine is conditioned for the printing of a new balance in the "New Balance" column in a passbook;

Fig. 8 illustrates portions of control means governed by the paper carriage;

Fig. 9 is a view similar to Fig. 7 but shows the positions of the parts after the new balance has been printed in the "New Balance" column of a passbook and the paper carriage has been moved out of the new balance columnar position;

Fig. 10 shows some elements of the machine in the positions which they occupy in the course of preparation of the machine for the taking and printing of a negative or overdraft balance;

Figs. 11 and 11A are a left side elevation of the machine with the casing thereof removed and show portions of the means for preventing incorrect operations of the machine;

Fig. 12 is a right side view of parts of the machine concerned with the printing of symbols alongside of the amounts printed;

Fig. 13 is an enlarged right side view of some of the symbol printing control elements;

Fig. 14 is a rear view of the symbol printing type bar and of adjacent amount printing type bars to show the arrangement of the symbols on the symbol printing type bar;

Fig. 15 is a right side view of some of the symbol printing control parts in the positions they occupy as the machine is operated to print a positive balance in the "New Balance" column of a passbook;

Fig. 16 is a right side view of some of the symbol printing control parts in the positions which they occupy as the machine is operated to print a total after having printed a subtotal balance in the "New Balance" column of a passbook;

Fig. 17 is a right side view of some of the symbol printing control parts in the positions which they occupy as the machine is operated to print an overdraft or negative balance in the "New Balance" column of a passbook;

Fig. 18 is a right side view of some of the symbol printing control parts in the positions which they occupy as the machine is operated to print a negative or overdraft total following the printing of an overdraft balance in the "New Balance" column of a passbook;

Fig. 19 is a right side elevation of portions of a modified form of the invention showing the positions of the parts after the carriage has been moved into the passbook "New Balance" columnar position after the total key has been partially depressed while the carriage was in another columnar position;

Fig. 20 is a detailed view of portions of Fig. 19;

Fig. 21 is a right side elevation of portions of the symbol printing control means of the modified form of the invention showing the parts in their normal positions;

Fig. 22 is a view similar to Fig. 14 but showing the arrangement of the symbol type on the symbol printing type bar for the modified form of the invention;

Fig. 23 is a right side view of some of the symbol printing control elements in the modified form of the invention in the positions which they occupy as the machine is operated to print a positive total after an operation of the machine other than for printing a subtotal in the "New Balance" column of a passbook;

Fig. 24 shows portions of the control means of the modified form of the invention with the parts in the positions they occupy when the machine is operated for printing a negative total after an operation of the machine other than an operation for printing a subtotal in the "New Balance" column of a passbook; and

Fig. 25 illustrates samples of work performed on a machine equipped with the invention.

The invention has been illustrated as applied to a Burroughs portable calculating machine of a general construction which, except as herein disclosed, is similar to that disclosed in the Horton Patent 1,853,050 as modified in accordance with the disclosure in the Butler Patent 1,992,142. It will be apparent, however, that the invention may also be embodied in machines of other constructions.

The machine equipped with the present invention has a laterally shiftable paper carriage C (Fig. 1) generally similar to that disclosed in my prior Patent No. 2,317,086, to permit the printing of entries in a plurality of columns. The paper carriage comprises a supporting plate 50 (Figs. 1 and 6) which is supported by anti-friction rollers 51 on a raceway 52 fixed to a plate 53 removably mounted on the machine frame. A long spring 55 secured at one end to a stud 56 on the right-hand end of the raceway 52 passes around a pulley 57 rotatably mounted on the left end of the raceway 52 and is secured at its other end to a stud 58 fixed in the right-hand end of the supporting plate 50 of the carriage whereby the paper carriage is constantly yieldingly urged to the left as viewed from the front of the machine.

A toothed or notched bar 60 (Figs. 1, 4 and 5) supported on the rear of the paper carriage C carries a plurality of clips 61 which project rearwardly from said notched bar 60 to be engaged by the upper end of a pawl 62 secured to a shaft 63 journaled in the rearwardly turned ends of a frame 64 secured to the underside of the raceway 52. The pawl 62 projects downwardly from shaft 63 and its lower end is adapted to cooperate with a pawl 65 pivoted at 66 on a slide 67. The pawl 65 is urged counterclockwise in Fig. 4 by a spring 68 but is normally held in the position of Fig. 4 by a stud 69 engaging the rear end of the pawl and carried by the lower arm of a lever 70 (Fig. 1) pivoted on the end of the shaft 63. The stud 69 cooperates with a detent lever 71 having two notches, the adjacent edges of which are inclined

toward each other. The detent lever is pivoted on a stud 72 on the frame 64 and urged counterclockwise by a spring 73 to yieldingly hold the stud 69 in whichever of the notches of the detent lever 71 the stud happens to be, but permits the lever 70 to be moved manually to shift the stud 69 for a purpose explained later. For the present, it will be assumed that the stud 69 is in the rearward position shown in Fig. 1. The slide 67, which occupies the position of Fig. 4 while the machine is at rest, has a slotted downward projection 75 engaging over a stud 76 on a side arm of a yoke 77 which is pivoted on a shaft 78 and is the yoke 279 of the Horton Patent 1,853,050. The yoke 77 carries a rod 81 normally engaged between forward projections 82 and 83 of a yoke 84 which corresponds to the part 286 of the Horton Patent 1,853,050 and is rockably and slidably mounted on the shaft 78 and rocked first clockwise (Fig. 4) during the forward stroke and counterclockwise during the return stroke of each machine cycle and so normally rocks the yoke 77 likewise. As the yoke 77 is rocked clockwise it moves the slide 67 rearwardly so that the upturned rear end of the pawl 65 passes rearwardly of the stud 69 whereupon the spring 68 rocks the pawl 65 counterclockwise. The slide 67 and pawl 65 are moved sufficiently rearwardly so that the shoulder 79 on the pawl engages behind the lower end of the pawl 62 near the end of the forward stroke of the machine cycle, at about which time the printing mechanism of the machine, which is controlled by the yoke 77, operates to print. During the return stroke of the cycle, the counterclockwise movement of the yoke 77 moves the slide 67 and pawl 65 forwardly, rocking the pawl 62 sufficiently to disengage its upper end from the currently engaged clip 61 and thus release the carriage for movement to the left by the spring 55. This occurs prior to the time that the stud 69 is engaged by the inclined cam edge 80 of the pawl 65 and cams said pawl clockwise to disengage the shoulder 79 from the lower end of the pawl 62 which is thus released and permitted to be returned counterclockwise to its position of Fig. 4 in time to engage the next column stop clip 61 on the carriage, which is thus arrested in its next columnar position.

A stud 85 on a rearwardly projecting lug on the upper arm of the pawl 62 is engaged in a slot in a lever 86 (Fig. 1) pivoted on a stud 87 (Fig. 4) secured in the left-hand end portion of the frame 64 and urged counterclockwise by a spring 88 (Fig. 1), which thus also urges the pawl counterclockwise to the normal position of Figs. 1 and 4. A forwardly projecting portion of the lever 86 carries a roller 89 positioned behind the lower edge of a plate 90 extending lengthwise of the carriage and secured at its upper edge to a shaft 91 journaled at its ends in the carriage frame. A finger lever 92 is secured to the right end of the shaft 91 so that when the upper end of the lever 92 is pulled forwardly by the operator the blade 90 is rocked counterclockwise and rocks the lever 86 clockwise against the tension of its spring 88 and thereby also rocks the pawl 62 clockwise to move its upper end rearwardly of the rearward projecting portions of the column clips 61, whereupon the operator may move the carriage laterally to another column position where, upon releasing the finger lever 92, the spring 88 returns the lever 86 and pawl 62 counterclockwise to engage the pawl 62 with the desired column clip 61. The throw of the finger lever 92 is limited by a stud 93 on the carriage frame engaging in a notch in

said lever, the notch being of sufficient width to permit the finger lever 92 to move far enough to rock the upper end of the pawl 62 rearwardly a short distance farther than the upper end of said pawl is rocked rearwardly in automatic tabulation during machine cycles. The operator may also disengage the upper end of the pawl 62 by grasping the upper rear end of the lever 86 and rocking it clockwise and thereby rock the upper end of the pawl 62 still farther rearwardly than is possible through manipulation of the finger lever 92. The result of this arrangement is that the paper carriage can automatically tabulate during successive machine cycles through certain columnar positions determined by column stop clips 61 of the form shown in Fig. 4, but will not automatically tabulate past a columnar position determined by a column stop clip 61 having a medium sized rearward projection as shown at *a* in Fig. 5. However, when the operator desires that the carriage should tabulate past such a columnar position, the operator may pull finger lever 92 forwardly as far as permitted and thus move the upper end of the pawl 62 rearwardly of the rearward projection *a* on such column stop clip. However, in manipulating the finger lever 92 to cause tabulation of the carriage, the operator is prevented from inadvertently moving the carriage beyond a columnar position determined by a column stop clip having a longer rearward projection as indicated at *b* in Fig. 5. But if, for any reason, it is desired to move the paper carriage beyond the latter columnar position, it is only necessary to grasp the lever 86 and directly rock it as far clockwise as possible to move the upper end of the pawl 62 out of the range of the long rearward projection *b* on the column stop clip.

Tabulation of the paper carriage may be manually disabled or normalized at any desired columnar position of the carriage by means of the lever 70. With the parts positioned as in Figs. 1 and 4, the paper carriage will, during successive machine cycles, automatically tabulate through a series of columnar positions determined by column stop clips 61 of the form shown in Fig. 4. However, if the lever 70 is rocked clockwise from its Fig. 1 position, the stud 69 is moved forwardly into the forward notch in the detent 71 and yieldingly held in that position where it will engage the forward inclined edge 94 of the pawl 65 during each rearward movement of the slide 67 and pawl 65 and cam the pawl sufficiently clockwise to prevent engagement of its shoulder 79 with the lower end of the pawl 62 and thus prevent automatic rocking of the pawl 62 and tabulation of the paper carriage during the return stroke of the machine cycle.

The paper carriage carries a split platen comprising a right-hand portion *Pr* (Figs. 1 and 4) freely rotatably supported on the platen shaft 100 and a left-hand section *Pl* (Fig. 11) secured to the platen shaft 100 to rotate therewith. A journal sheet or strip *J* (Figs. 4 and 25) is passed around the left-hand section *Pl* of the platen and line-spaced at appropriate times by automatic line-spacing mechanism. The yoke 77 (Fig. 4) carries a stud 101 engaging in a short slot 102 in a lever 103 pivoted on the shaft 78. The upper slotted end of the lever 103 receives a rod 104 supported at its ends on the lower ends of links 105 pivoted on a cross rod 106 (Fig. 1) of the carriage frame. A line-spacing pawl 107 pivoted on the end of the rod 104 is urged clockwise by a spring 108 (Fig. 4) tending to engage the forward end of

the pawl 107 with the teeth of the ratchet wheel 109 secured to the platen shaft 100. However, the pawl 107 is normally held out of engagement with the ratchet wheel 109 by a stud 110 secured in the carriage frame and engaging a cam edge on the pawl which is so inclined that when the pawl 107 moves rearwardly during each machine cycle, the stud would permit the point of the pawl to engage the ratchet if the pawl were not otherwise blocked. A lever 111 pivoted on a stud 112 secured in the carriage frame has a lateral extension forming a shield 113 to control engagement of the pawl 107 with the ratchet 109. The lever 111 is pivotally connected at its upper end with the forward end of a link 114 (Fig. 4) which is urged rearwardly by a spring 115 to normally position the shield as in Fig. 4 so that it prevents engagement of the pawl 107 with the ratchet 109 during machine cycles. The link 114 is connected at its rearward end to an arm 116 secured on a shaft 117 which is journaled at its ends in the carriage frame and is also secured to the upper edge of a plate or blade 118 extending lengthwise of the carriage. A roller 119 positioned behind the lower edge of the blade is carried on the upper end of an arm 120 extending upwardly from a yoke 121 pivoted on a rod 122 carried by a bracket 123 secured on the frame 64. The arm 120 has laterally extending cam arms 125 adapted to cooperate with one or more line-spacing control studs 126 carried by supporting blocks 127 mounted on the stop bar 60. When the paper carriage moves into a columnar position where automatic line spacing of the journal sheet or strip is desired, a stud 126 engages one of the lateral cam arms 125 of the arm 120 and rocks the arm counterclockwise causing the roller 119 to rock the blade 118 and arm 116 clockwise and move the link 114 forwardly against the tension of its spring 115. The link 114 in turn rocks the lever 111 counterclockwise, moving the shield 113 sufficiently rearwardly so that during the counterclockwise rocking of the yoke 77 and lever 103 during the return stroke of the next machine cycle performed while the paper carriage remains in that columnar position, the point of the pawl 107 will engage a tooth of the ratchet wheel 109 and rotate the ratchet wheel and platen shaft 100 one line space clockwise. This advances the left-hand journal section *Pl* of the platen, which is fixed on the platen shaft 100, one line space.

Automatic line spacing of the right-hand or passbook section *Pr* of the platen is not required because as a rule only one line of entries will be made in a passbook at one time. Also, freely rotatably mounting the right-hand or passbook section of the platen on the platen shaft facilitates the insertion of the passbook into the machine as it avoids the friction between the passbook and platen which would result if this section of the platen were held against rotation as the passbook is inserted.

The passbook *B* is inserted from the rear of the platen and is guided forwardly under the platen by a fixed guide plate 130 secured in the carriage frame. Forwardly of the front edge of the guide plate 130, a second guide plate 131 secured on the plate 53 directs the leading edge of the passbook being inserted into a gripping device mounted on the carriage above the right-hand section of the platen. This gripping device comprises a fixed plate 132 secured to a cross-shaft 133 of the carriage frame and having, at the upper ends of its laterally edges, rearwardly turned ears 134 supporting studs 135 on which

rearwardly bent lugs on the side arms 136 of a passbook gripping bail 137 are pivoted. A spring 142 urges the bail 137 against the plate 132. A rearward extension of the lug on the right-hand side arm of the bail 137 pivotally supports a finger latch lever 138 having on its upper end a finger piece 139 and having its lower arm formed with a latch hook cooperating with a stud 140 fixed in the right-hand side plate of the platen frame. A spring 141 connected at its upper end to a stud 143 on the lower arm of the finger latch lever 138 urges the latch lever clockwise in Fig. 4.

The full lines in Fig. 4 show the bail 137 in gripping position with the forward end of the latch hook on the finger latch lever 138 engaging against the rear side of the stud 140. When the operator moves the finger piece 139 rearwardly, the lever 138 is first rocked clockwise about its point of engagement with the stud 140 and thus rocks the bail 137 clockwise to the position shown in dot and dash lines in Fig. 4, the forward end of the hook portion of the lever 138 meanwhile moving downwardly around the rear side of the stud 140 and finally moving under the stud, whereby the parts are then latched with the bail 137 in the open or passbook receiving position. As the passbook is then inserted around the platen its forward edge will be guided between the plate 132 and bail 137.

After the passbook has been adjusted to the proper line position for the entry to be made, the passbook holding bail 137 may be moved to clamping position manually by pulling forwardly on the finger piece 139, whereby the lever 138 is rocked counterclockwise about the stud 140 until the hook portion of the lever is moved from beneath the stud 140, whereupon the spring 142 rocks the bail 137 against the passbook to grip it against the plate 132. However, to relieve the operator of the necessity of manually closing the passbook holder, a means has been provided for automatically unlatching the latch lever during the forward stroke of the machine cycle prior to printing.

A lever 145 pivoted on the stud 140 is connected with the lower end of the spring 141 and thus normally urged counterclockwise to the position shown in Fig. 4 where a rearward projection on said lever engages a stud 146 fixed in the carriage frame. The lever 145 carries a stud 147 positioned in front of the lower end of the latch lever 138 so that when the latch lever is moved to latched position, where it holds the passbook holder in open or passbook receiving position, the lever 145 is rocked clockwise from its Fig. 4 position, thereby positioning the lower end of its downward extension 148 in engagement with the rear side of the rod 104. During the initial portion of the forward stroke of the next machine cycle, the rod 104 moving rearwardly rocks the lever 145 counterclockwise toward its Fig. 4 position and the stud 147 engaging the lower end of the latch lever 138 rocks the latter counterclockwise, disengaging it from the stud 140 and permitting the spring 142 to move the passbook gripping bail 137 to closed or passbook holding position.

The machine is provided with an electric drive of the kind disclosed in the Horton Patent 2,004,282. It has two motor bars as disclosed in the Butler Patent 1,992,142, an add motor bar 170 (Fig. 3) and a subtract motor bar 171, the stems 172 and 173 of which are slotted to slide on fixed studs 174 and 175 secured in the machine frame and also slotted to receive studs 176 and 177 se-

cured in a motor control slide 178 slidably guided on the stud 174 and on a shaft 179. The motor control slide 178 has a rearwardly extending projection 180, the rearward end of which engages a stud 181 on a lever 182 pivotally mounted on the shaft 179 and connected through a spring 183 to the upper arm of the bell crank 184 secured to the shaft 179, the rear arm of said bell crank 184 having a lateral lug 185 projecting over the top edge of the lever 182, whereby downward movement of the motor control slide by depression of either one of the motor bars causes the bell crank 184 and shaft 179 to be rocked clockwise through the spring 183. The motor bars are yieldingly held in normal undepressed position by springs 186 and 187 connected with the respective studs 174 and 175 and with studs 188 and 189 secured in the respective motor bar stems 172 and 173. The motor control slide is yieldingly held in its normal upper position by a spring 190 connected with a stud in said slide and with the subtract motor bar stem 173. The shaft 179 is urged counterclockwise to its normal position by a spring 191 connected to a stud 192 secured in the machine frame and to a third arm 193 of the bell crank 184.

The shaft 179 corresponds to the shaft 56 of the Horton Patent 2,004,282 and, through connections like those disclosed in said Horton patent, controls a switch in the electrical supply circuit of the drive motor (not shown) and also controls the drive clutch (not shown) which, through suitable connections, rotates a crank 195 (Fig. 11) corresponding to the crank 34 of the Horton patent. As in the Horton Patent 2,004,282, the crank 195 is connected through a link 198 to an arm 199 pivoted loosely on the shaft 200 and secured to a drive arm 201 also pivoted on the shaft 200. The arm 201 has a shoulder 202 adapted to cooperate with a shoulder 203 on a pawl 204 pivoted on a stud 205 carried by a full stroke sector 206 through which the operating parts of the machine are driven as disclosed in said Horton patent and in the Horton Patent 1,853,050. A spring 207 connected at one end to the pawl 204 and at its other end to a stud 208 on the full stroke sector 206 normally yieldingly holds the pawl in the effective position shown in Fig. 11 where the pawl will be entrained by the arm 201 as the arm is rocked clockwise (Fig. 11) when the motor switch and drive clutch are engaged. The motor then drives the arm 201 and the full stroke sector 206 clockwise as viewed in Fig. 11 in the forward stroke of the machine cycle, but the full stroke sector and arm are returned counterclockwise to normal by springs as disclosed in the above-mentioned Horton patents in the return stroke of the machine cycle.

The drive connections will be disconnected at an early point in the clockwise movement of the arms 199 and 201 when the motor switch and clutch are connected while the machine is improperly conditioned in various ways as disclosed in said Horton patents. The disconnecting means comprises a plate 210 pivoted on a stud 211 secured in the left-hand side plate of the machine frame and having a hook portion 212 which is normally in the path of a shoulder 213 on the pawl 204. The plate is formed with a slot 214 in which engages a stud 215 carried by the rear end of the rearwardly extending arm 216 of a lever 217 pivoted on a shaft 218 carried by lugs depending from the forward end of the keyboard as disclosed in the Horton Patent 1,853,050. A swinging cross rod 220 is carried by the lever 217 and by a link (not shown) supported on the right-

hand end of the shaft 218, the rod 220 cooperating with the zero stops and key latch slides of the machine as described in detail in the Horton Patent 1,853,050.

Briefly, when a cycle of the machine is initiated with the machine properly conditioned for operation, the lever 217 and the cross rod 220 will be swung rearwardly or clockwise as viewed in Fig. 11 during the initial portion of the machine cycle so that the stud 215 moving in the slot 214 in the plate 210 will cam the plate 210 counterclockwise and remove the hooked portion 212 of the plate from the path of the shoulder 213 of the pawl 204 early enough to prevent disconnection of the motor drive from the full stroke sector 206 and general operating mechanism of the machine. If, however, a machine cycle is initiated with the machine improperly conditioned for operation, the cross rod 220 and lever 217 are prevented from rocking sufficiently to remove the hooked portion 212 of the plate 210 from the path of the shoulder 213 on the pawl 204 so that before the full stroke sector and operating parts of the machine have been moved too far to permit them to be returned directly to normal position without causing incorrect results or other difficulties due to failure to drive them through a full cycle of operation, the hooked portion 212 of the plate 210 engages the shoulder 213 on the pawl 204 and rocks the latter counterclockwise and disengages its shoulder 203 from the shoulder 202 on the motor driven drive arm 201, thus permitting the general operating mechanism of the machine and the full stroke sector 206 to be returned to normal by the usual springs while the motor drive continues through the usual cycle of operation before the clutch is disconnected and the motor switch opened. This disconnectible drive connection is utilized in the present invention in a manner which will be described in detail later.

The machine of the present invention has an adding and subtracting register substantially identical with that disclosed in the Butler Patent 1,992,142 and controlled in substantially the identical manner in adding and subtracting and positive and negative total-taking and subtotal-taking operations. This register comprises a line of pinions 225 (Fig. 11) each of which is constantly in mesh with a respective pinion of a line of pinions 226, both lines of pinions being carried in a tumbling frame 227 in which are secured two stub shafts 228 (Fig. 11) and 229 (Figs. 3 and 10) journaled in a main register frame 230 secured to a shaft 231 journaled in the machine frame, the axis of the stub shafts 228 and 229 being midway between the axes of the lines of pinions 225 and 226. As in said Butler patent the tumbling of the register from add position (Figs. 3 and 11) to subtract position and reversely is controlled by an arm 232 (Fig. 3) corresponding to the arm 39 of said Butler patent and adapted to be positioned to selectively block forward movement of either of two studs 233 and 234 carried by arms 235 and 236 (Fig. 3) secured on the right-hand stub shaft 229 of the register tumbling frame so that the frame 227 carrying the pinions will be tumbled as the main register frame 230 is rocked to carry the register toward the actuator segments 237 (Fig. 11). The arm 232 forms part of a yoke 238 pivoted on a stud 239 secured in the right-hand side plate of the machine frame and having a stud and slot connection with a three-armed lever 240 pivoted on a stud 241 secured in the machine frame so that counterclockwise movement of the lever 240 causes clockwise move-

ment of the yoke 238 and arm 232, and counterclockwise movement of the yoke 238 and arm 232 causes clockwise movement of the lever 240.

A forwardly extending arm 245 of the yoke 238 carries a stud 246 which is engageable by a rearwardly extending projection 247 of the + motor bar stem 172 and the forwardly extending arm of the lever 240 carries a stud 248 engageable by a rearward projection 249 of the - motor bar stem 173, whereby depression of either the + motor bar or - motor bar not only closes the motor switch and drive clutch but also sets the add-subtract register control arm 232 to position the register pinions 225 and 226 for an operation of the algebraic sign corresponding to the + or - sign of the depressed motor bar.

Positive and negative totals and subtotals are taken from the register and printed in the same manner as in the machine of said Butler patent, the machine having total and subtotal keys T and ST which are locked against depression when a negative total occurs in the add-subtract register by means of a negative total lock slide 260 (Fig. 3) which, as in said Butler patent, is controlled from the pinion of the highest order of the add-subtract register through a train of connections to the lever 261 secured on the end of the shaft 262, and cooperating with a projection 263 on the slide 260. Said shaft 262 and lever 260 correspond to the parts numbered 121 and 122 of said Butler patent.

Figs. 1 and 3 show the parts in the positions they occupy when a positive total is contained in the register. At this time the negative total lock slide 260, corresponding with the slide numbered 124 in said Butler patent, is so positioned that it does not prevent depression of either the total key T or the subtotal key ST but it does prevent depression of an overdraft release key OD. When a negative total occurs in the register, the slide 260 is moved forwardly to lock the total and subtotal keys T and ST against depression and unlock the key OD for depression. When the key OD is depressed, the lower end of the stem 265 thereof, engaging a lateral lug on the forward end of a lever 266 (Figs. 3 and 10) pivoted on the stud 241, depresses said lever which has a rearward arm 267 which has a stud and slot connection with one arm of a yoke 268 which corresponds to the yoke 160 of the Butler Patent 1,992,142 and is pivoted on a rod 269 supported in the machine frame. The lever 266 also engages a stud 270 secured in the stem 173 of the - motor bar and depresses said motor bar to give the machine a cycle of operation during which the add-subtract register is tumbled to subtracting condition. During this cycle a "fugitive 1" is subtractively entered in the register by means controlled by said yoke 268.

As in said Butler patent, the subtractive entry of a "fugitive 1" in the add-subtract register causes clockwise movement of a yoke 271 corresponding to the part numbered 213 in said Butler patent and pivoted on the rod 269. The yoke 271 is connected through a spring 272 with a second bell crank 273 pivoted on a stud 274, secured in the machine frame and, in moving clockwise, rocks the bell crank 273 counterclockwise. The bell crank 273 has a second arm 275 which thereupon moves the slide 260 still farther forward to a position where it again locks the overdraft release key OD but no longer locks the total and subtotal keys T and ST so that, except for further means controlling the total and subtotal keys as hereinafter described, the

total key or subtotal key may be depressed to take a negative total or negative subtotal. A "fugitive 1" is automatically additively entered in the add-subtract register, as disclosed in the said Butler patent, during the first subsequent machine operation in which the register is tumbled to adding position.

A bell crank 280 pivoted on the stud 241 and having a rearwardly extending arm formed with lateral lugs 231 embracing the rearward arm of the lever 233, 237 is also rocked counterclockwise by the depression of the key OD so that the upwardly extending arm of the bell crank 280 moves forwardly the right-hand arm of a bell crank 232 pivoted on the machine frame and having a rearward arm 283 with a slotted end engaging a stud 284 on the yoke 84. Depression of the key OD thus slides the yoke 84 to the right out of engagement with the rod 81 carried by the yoke 77 so that the latter as well as the printing, line spacing and tabulating mechanisms which it drives will not operate during the machine cycle initiated by depression of the key OD.

The total and subtotal keys T and ST, an account number key 285 and a non-add key NA each cause the machine to be given a cycle of operation when the key is depressed. The stems of the keys NA and 285 have lateral lugs 286 and 287, respectively, overlying portions of the motor control slide 178 so that each of these keys, when depressed, directly depresses the motor control slide. Both keys NA and 285 also condition the machine for non-add operation in the manner in which the machine of the Horton Patent 1,853,050 is conditioned for non-add operation by the key NA of said patent. The key 285 also, through connections not illustrated, causes the two lowest orders of the printing mechanism to be disabled for the machine operation caused by depression of said key so that the higher orders may be used for printing an account number without the printing of a decimal mark and two zeros after the account number.

The stems of the total and subtotal keys T and ST have lugs 288 and 289 (Fig. 3) overlying lugs 290 and 291, respectively, on a lever 292 pivoted on a fixed stud 233 and urged clockwise by spring 294 connected between a lug on the lever 292 and a stud secured in the machine frame. A slide 295, slidably mounted on the forward portion of the lever 292, has upward and downward projections 296 and 297 at its forward end. The upper extension 296 of the slide 295 passes through an aperture in the slide 298 slidably mounted on the lower plate 299 of the keyboard. A spring 300 connected between a lug on the lever 292 and a lug on the slide 295 urges the slides 295 and 298 rearwardly so as normally to hold the rear end of the slide 298 in engagement with the arm 275. The parts normally occupy the position shown in Fig. 3, where the lower projection 297 on the slide 295 is above a stud 301 on a projection extending upwardly from the portion 247 of the + motor bar stem 172. If the machine is given a total-taking or a subtotal-taking operation by depression of the total or subtotal key with the parts in such normal positions, which is possible only when the register contains a positive total so that the total and subtotal keys are not locked by the slide 260, the lug 288 or 289 on the stem of the depressed total or subtotal key T or ST rocks the lever 292 counterclockwise and the projection 297 on the slide 225 causes depression of the + motor bar.

When the machine is given an operation by depression of the key OD, which is possible only when the register contains a negative total and the key OD is, therefore, not locked by the slide 233, whereby a "fugitive 1" is subtractively entered in the register and the arm 275 is accordingly rocked counterclockwise from its Fig. 3 position, the slide 295 is moved forwardly so that its lower projection 297 is positioned over a stud 302 secured in the stem 173 of the — motor bar.

The arm 275 and slide 295 will remain in the last-described positions until the machine is given a cycle of operation by depression of the + motor bar which, as previously explained, causes the register to be tumbled to adding position. As also previously mentioned, a "fugitive 1" is additively entered in the register in the first operation of the machine in which the register is tumbled to adding position following an operation, initiated by depression of the key OD, in which a "fugitive 1" is subtractively entered in the register. If the machine is given a total-taking or subtotal-taking cycle by depression of the total key or subtotal key T or ST while the slide 295 is in its forward position, which, for the reasons above mentioned, can happen only while a negative total is contained in the register, the downward movement of the lever 292 and slide 295 caused by the depression of the total or subtotal key will cause the depression of the — motor bar so that the total or subtotal will be taken from the register while the latter is in the subtracting position, i. e., a true negative total or subtotal will be taken.

The control keys NA, 285, OD, T and ST, when depressed, are latched in depressed position by the usual key latch slide 305 and, when the latch slide 305 is moved to releasing position near the end of the machine cycle, are restored to normal by a spring the spring 306 shown in Fig. 11, there being one such spring for each vertical row of keys on the keyboard.

The machine is also provided with a counter 310 (Fig. 1) similar to that disclosed in the Racz Patent 2,074,026, except that in the present machine the connections for operating the counter are controlled by the subtotal key so that only subtotal-taking operations of the machine are counted. As in the above-mentioned Racz patent, the counter 310 is actuated by a bell crank 311 which is pivoted on a stud 312 carried by a yoke 313. The rearward arm of the bell crank 311 has a shoulder 314 adapted to cooperate with a lateral lug 315 on a yoke 316 which is pivoted on the stud 317 and has a cross bail 318 extending across the forward edges of the usual printing hammers 319. When the machine is operated, if any of the printing hammers are rocked counterclockwise (Fig. 1) preparatory to being fired to drive the corresponding type bars 320 against the platen, the bail 316 is rocked counterclockwise and the lug 315 moved forward. If, at this time, the shoulder 314 is in the path of the lug 315, the yoke 313 will be actuated to add a unit in the counter 310.

A spring 325 connected to a lateral lug on the bell crank 311 normally urges the bell crank to move its shoulder 314 upwardly into the path of the lug 315 but is normally held in the position of Fig. 1, where the shoulder 314 is out of the path of the lug 315, by reason of engagement of a lateral lug 326 on the downward arm of the bell crank 311 by a lever 327 pivoted on the stud 317 and urged counterclockwise by a spring 328

strong enough to overcome the tension of the spring 325. The under side of the forward arm of the lever 327 is engaged by a lateral lug 330 on one arm of a yoke 331 also pivoted on the stud 317 and having a rearward arm 332 having a lateral lug positioned under a hooked projection 333 on a lever 334 which is pivoted on a stud 335 secured in the machine frame and has its forward end positioned under the stem of the subtotal key ST. When the subtotal key is depressed, the lever 334 is rocked counterclockwise and the projection 333 thereof rocks the yoke 331 clockwise, which in turn rocks the lever 327 clockwise against the tension of its spring 328 and permits the spring 325 to rock the bell crank 311 counterclockwise to position its shoulder 314 in the path of the lug 315, so that if any of the printing hammers are operated during the machine cycle initiated by the depression of the subtotal key ST, a unit will be entered in the counter 310.

In addition to the printing mechanism comprising the printing hammers 319 and type bars 320, which printing mechanism is generally similar to that disclosed in the Horton Patent 1,853,050, the present machine may also be provided with a suitable date printer of the well known rotary type wheel variety or the higher order type bars 320 of the regular printing mechanism may be employed for date printing.

An understanding of the invention will be facilitated by considering some examples of work performed on the machine embodying the invention before proceeding with a description of the further mechanisms involved.

Examples of work

As previously mentioned, a journal sheet or strip J is placed around the left-hand section P1 of the split platen and passbooks B or the like may be inserted around the right-hand section of the platen. The work to be performed may involve the posting of savings account passbooks in a bank, for which use the machine is very well adapted, or may be work involved in any of the classes of business, such as collections on installment sales of merchandise or securities, in which credits or debits or both, together with new balances, are to be entered into a record book or passbook to be kept by the customer, a continuous record of the day's postings is to be kept on a journal sheet or strip retained by the proprietor of the machine, and errors or incorrect or fraudulent entries are to be guarded against.

For convenience, the examples of work illustrated in Fig. 25 and now to be described may be assumed to involve the posting of a savings account passbook on a machine kept at the teller's window in a bank. The posting operation will be started with the carriage of the machine positioned for printing of the account number, appearing on the passbook, in the "Account Number" column of the journal J, such column being designated by the numeral "1" in Fig. 25. The account number "125" is set up on the keyboard of the machine and the machine given a cycle of operation by depression of the key 285. During the latter part of the non-add and account number printing cycle of operation, the pawl 55 rocks the pawl 62 and permits the spring 55 to tabulate the paper carriage to the next columnar position and thereby position the journal to receive a printed entry in the old balance pickup column designated by the number "2" in Fig. 25. The operator then enters, on the keyboard of the machine, the

amount of the last balance appearing in the passbook and then depresses the + motor bar 170, which gives the machine a cycle of operation to print the old balance in the "Pick-up" column and conditions the registering mechanism for an adding operation so that the old balance is added in the register mechanism. In the course of the old balance entering cycle of operation of the machine, the paper carriage automatically tabulates to the next or third columnar position where it positions the passbook B to receive a printed entry in the "Withdrawal" column designated "3" in Fig. 25. The first posting illustrated in Fig. 25 involves a deposit item rather than a withdrawal and the operator will therefore tabulate the paper carriage to the fourth or deposit columnar position, either manually by operating the finger lever 92, or by giving the machine a blank cycle by depressing one of the motor bars. The operator then enters the amount deposit on the keyboard and gives the machine a cycle of operation by depression of the + motor bar, in the course of which operation the amount deposit is printed in the "Deposit" column of the passbook, and the paper carriage then tabulates to the fifth columnar position where the "Date" and "New Balance" columns of the passbook B are positioned for receiving printed entries of the date and of the amount of the new balance, respectively.

With the paper carriage in the fifth columnar position, the machine cannot be operated in any way other than by depression of the subtotal key ST which is disabled in all other columnar positions of the carriage excepting the new balance columnar position, 5 in the illustrated example. Thus, depression of the subtotal key ST to complete the posting when the carriage arrives in the passbook "New Balance" columnar position is enforced. The operator will, therefore, depress the subtotal key ST, which causes the machine to be given a cycle of operation in the course of which the amount of the new balance is printed in the "New Balance" column of the passbook. During this cycle of operation the paper carriage does not automatically tabulate because this passbook "New Balance" columnar position of the paper carriage is determined by a column stop clip 64 of the form indicated at a or b in Fig. 5.

The subtotal key is automatically again disabled during the course of the new balance printing cycle of operation, but the machine is also automatically so conditioned that the total key is enabled for operating the machine upon depression after the paper carriage is moved out of the passbook "New Balance" columnar position. Thus, in order to give the machine a further cycle of operation it is necessary for the operator to move the paper carriage out of the passbook "New Balance" position. The work requires that the new balance be printed in a total-taking operation of the machine in the "New Balance" column of the journal sheet or strip, this column being designated "6" in Fig. 25. The operator will, therefore, move the paper carriage to the journal "New Balance" columnar position and operate the machine by depression of the total key as the machine may not be operated in any other way after a subtotal-taking operation. During the course of the total-taking cycle of operation and after the taking and printing of the total which clears the register, the pawl 55 will operate the pawl 62 to tabulate the carriage to the account number position (column 1) where the next line of posting will begin, and the lefthand or journal section

of the platen will be line-spaced owing to the fact that a line-space control stud 125 is so positioned on the paper carriage as to render the line-space mechanism effective for automatic line spacing in each operation of the machine while the paper carriage is in the column "6" position. Depression of the total key and the resultant cycle of operation of the machine also cause restoration of the controls to condition permitting subsequent operations of the machine by depressions of either of the motor bars, the non-add key or the account number key 285, and so that the subtotal key ST remains disabled until the paper carriage again reaches the passbook "New Balance" column position. The total key is again disabled after the total printing operation immediately following the subtotal printing operation and remains so disabled until the machine is given another subtotal-taking operation with the paper carriage in the passbook "New Balance" columnar position and until after the paper carriage is again moved out of the latter position.

The second line of posting in Fig. 25 is performed in the same manner as described with reference to the first line of posting in said figure, excepting only that the second line of posting involves a withdrawal item which is printed in a machine cycle initiated by depression of the — motor bar while the paper carriage is in the "Withdrawal" columnar position, after which the paper carriage automatically tabulates to the "Deposit" columnar position from which the operator immediately tabulates the paper carriage to the passbook "New Balance" columnar position, inasmuch as no deposit item is involved.

Discussion of the further examples of work illustrated in Fig. 25 will best be deferred until after the construction and operation of the invention has been described.

Disabling subtotal key except while paper carriage is in pass-book New Balance columnar position

As mentioned above, the subtotal key ST is disabled from operating the machine at any time except when the paper carriage is positioned in the passbook "New Balance" columnar position and the last preceding operation of the machine also was not a subtotal operation, all other means of operating the machine being disabled when the paper carriage is in the passbook "New Balance" columnar position. The total key T is disabled from operating the machine at all times except when the paper carriage is positioned in a columnar position other than the passbook "New Balance" columnar position immediately following a subtotal-taking operation of the machine performed with the paper carriage in the passbook "New Balance" columnar position, and all other means of operating the machine excepting the total key T are disabled after a subtotal-taking operation of the machine and until the machine has been given a total-taking operation.

A lever 350 (Figs. 1, 6, 7 and 9) pivoted on a stud 351 fixed in the machine frame is pivotally connected at 352 to the forward end of a rearwardly extending link 353 which is urged forwardly by a spring 354 which thus normally yieldingly holds the link 353 and lever 350 in the position of Fig. 1 where the upwardly extending rear portion of a lug 355 on the lever engages against the rear side of the stem of the subtotal key and a shoulder of the lug on said lever is positioned under the stem of the subtotal key ST and thus prevents the subtotal key from being

depressed sufficiently to condition the machine for subtotal taking or to give the machine a cycle of operation. A slot in the rearward portion of the link 353 receives a stud 356 (Figs. 1 and 6) on a lever 357 pivoted on the stud 335 and connected through a spring 358 to a stud 359 in the upper rear arm of a three-armed lever 360 having a downward arm against which the stud 356 is normally held by the spring 358. The three-armed lever 360 is also urged clockwise by a spring 361.

The upper rear arm of the three-armed lever 360 is pivotally connected through the stud 359 to the lower end of a link 365 which is pivotally connected at its upper end (Fig. 8) to the left-hand end (looking at the machine from the rear) of a lever 366 pivoted intermediate its ends on a stud 367 secured in the rear side of the forward upstanding flange of the carriage raceway 52. The other end of the lever 366 is forked to receive a stud 368 secured in a lever 369 (Figs. 6 and 8) pivoted on a stud 370 secured in the forward flange of the raceway 52. The right end of the lever 369 (still looking at the machine from the rear) has a raised cam edge 371 adapted to cooperate with a roller 372 carried by a member 373 secured to the underside of the carriage supporting member 50.

The parts are so arranged and proportioned that when the carriage is in the passbook "New Balance" columnar position the roller 372 is above the raised cam edge 371 of the lever 369 and depresses the lever to the full-line position shown in Fig. 8, thus raising the link 365 from the position shown in Fig. 1 to the position shown in Fig. 6, thereby rocking the three-armed lever 360 against the tension of the spring 361 counterclockwise from the position of Fig. 1 to the position of Fig. 6. The spring 358 holding the stud 356 in contact with the lower arm of the three-armed lever 360 causes the stud 356 to move rearwardly, thereby moving the link 353 and lever 350 rearwardly against the tension of the spring 354 from the position of Fig. 1 to the position of Figs. 6 and 7, where the shoulder of the upstanding lug 355 on the lever 350 is slightly rearward of the lower end of the subtotal key stem. Thus the lever 350 prevents depression of the subtotal key ST at all times except when the paper carriage is moved into the passbook "New Balance" columnar position whereupon the roller 372 on the paper carriage acting through the connections just described moves the lever 350 to a position permitting depression of the subtotal key ST.

Preventing operation of the machine with paper carriage in the passbook "New Balance" columnar position except by depression of subtotal key

It will be noted that the lever 350 has a second upstanding lug 375 which is normally positioned under the stem of the total key T to prevent operation of the machine by depression of the total key, and that this lug 375 on the lever is still under the stem of the total key T and still prevents operation of the machine by depression of the total key when the lever 350 has been moved to the position of Figs. 6 and 7 upon movement of the paper carriage into the passbook "New Balance" columnar position.

When the link 353 is moved to the position of Fig. 6 as the paper carriage moves into the passbook "New Balance" columnar position, a cam finger 380 (Fig. 6) extending downwardly and

rearwardly from the forward end portion of the link engages a stud 381 on the lower arm of a two-armed lever 382 which is pivoted on the stud 241, and the forward portion of the upper arm of which is positioned above a lateral lug 334 on one (335) of a pair of links 385 and 386 which are connected together by stud and slot connections and normally held in the fully extended condition shown in Fig. 6 by a spring 387. The upper end of the link 385 is slotted to receive a stud 390 on a lever 391 (Figs. 7 and 9) which is pivoted on the stud 241 and normally urged clockwise to the position of Fig. 9 by a spring 392 but is rocked counterclockwise by depression of the total key T as disclosed in the Horton Patent 1,853,050. A spring 393 connected between the stud 390 and a lug 394 on the link 385 normally holds the links 385 and 386 in the elevated position shown in Figs. 1 and 3 where a lateral lug 395 on the lower end of the link 385, engaging under the lower edge of the right-hand side arm 396 of a yoke 397 pivoted on a stud 398 fixed in the machine frame, holds the arm 396 in the position of Figs. 1 and 3. However, when the lever 392 is rocked counterclockwise by the cam 380 in the rearward movement of the link 353 as the paper carriage moves into the passbook "New Balance" columnar position, the links 385 and 386 are lowered and the forward end of the arm 396 is lowered by gravity, aided by a spring 399 (Fig. 6) connected between the lug 395 on the link 385 and a projection on the arm 396, to position the forward end of the lever 396 behind a stud 400 on a slide 401 which corresponds to the slide 201 of the Horton Patent 1,853,050 and is yieldingly urged rearwardly by a spring 402 (Fig. 3) but normally held in the position of Figs. 1, 3, 6, 7, 9 and 10 by a stud 403 on the drive plate 404.

During each cycle of operation of the machine, as the drive plate 404 is rocked counterclockwise, as viewed in Fig. 3, during the forward stroke of the cycle, and the stud 403 moves rearwardly, the slide 401 is moved rearwardly by its spring 402. The forward end of the slide 401 bears against a roller 405 (Fig. 3) on the cross rod 220 and so, during the machine cycle, controls the rearward movement of the cross rod 220 by spring 219 and also moves the cross rod forwardly to operate the key latch slides 305 to release depressed keys near the end of the machine cycle as described in the Horton Patent 1,853,050. If rearward movement of the slide 401 is limited by engagement of the stud 400 by the forward end of the arm 396, the cross rod 220 is prevented from moving sufficiently rearwardly and the lever 213 is thus prevented from moving sufficiently counterclockwise in Fig. 11 to move the hooked portion 212 of the plate 210 out of the path of the shoulder 213 on the pawl 236 and the electric drive is thus disconnected from the general operating mechanism of the machine at the start of the machine cycle.

Thus, when the paper carriage moves into the passbook "New Balance" columnar position, the forward end of the arm 396 is lowered into the path of the stud 400 and prevents operation of the machine while the forward end of the arm remains behind the stud. To permit operation of the machine it is necessary to depress the forward end of the arm 396 below the path of the stud 400 by moving the linkage 385, 386 downwardly. This linkage, like the corresponding linkage 406, 407 in the Horton Patent 1,853,050, can be lowered only by depression of the total key T or subtotal key ST and, as the total key T

is locked against depression by the lug 375 on the lever 350, the subtotal key ST is thus the only means capable of causing the present machine to be operated when the paper carriage is in the passbook "New Balance" columnar position.

Upon depression of the subtotal key ST, the stem thereof engages the forward end of the upper arm of the lever 392 and depresses it still farther as in Fig. 7, thus lowering the linkage 385, 386 farther and lowering the forward end of the arm 396 below the path of the stud 400. The lower end of the link 386 is pivotally connected to the rear end of a pawl 406 which is pivoted on a stud 407 on the slidable pitman 408 by which the register is controlled as disclosed in the Horton Patent 1,253,050 as modified in accordance with the disclosure in the Butler Patent 1,992,142. The further depression of the linkage 385, 386 by the depression of the subtotal key ST rocks the pawl 406 from the normal position of Fig. 3 to the position of Fig. 7 where the forward end of the pawl is in the path of the roller stud 403 on the drive plate 404 and the parts are conditioned as described in the said Horton patent to cause a subtotal-taking operation.

Releasing total key and preventing operation of machine, except by total key after subtotal-taking operation

In a subtotal-taking operation, the pitman 408 is moved rearwardly by the stud 403 acting on the pawl 406 during the initial portion of the counterclockwise movement of the drive plate 404 during the forward stroke of the cycle and is returned forwardly to the position of Fig. 7 when the stud 403, near the end of the clockwise movement of the drive plate 404 during the final portion of the return stroke of the cycle, entrains the hook 409 (Figs. 3, 7 and 10) on the forward end of the lower branch of the pitman 408. As the lower end of the link 386 is pivoted to the rear end of the pawl 406 carried by the pitman 408, the linkage 385, 386 is swung counterclockwise about the stud 390 as the pitman 408 moves rearwardly, and is returned clockwise about the stud 390 as the pitman 408 returns forwardly. When the linkage 385, 386 is lowered by depression of the subtotal key ST as previously described, the lateral lug 394 (Figs. 6, 7 and 9) on the link 385 is moved down in front of a forwardly extending projection 410 on the lever 350. Then, as the linkage 385, 386 is rocked counterclockwise about the stud 390 during the forward stroke of the subtotal-taking cycle of operation of the machine, the lug 394 engages the projection 410 and rocks the lever 350 clockwise.

A latch lever 415 pivoted on a stud 416 (Fig. 6) fixed in the right-hand side plate of the machine frame is urged counterclockwise by a spring 417. The latch lever 415 has an upper arm with a hooked forward end which, in the normal position of the parts, is held by the spring 417 against a stud 419 on the lever 350. When the lever 350 is rocked rearwardly from the position of Fig. 1 by the paper carriage as the latter moves into the passbook "New Balance" columnar position, the hooked forward end of the upper arm of the lever 415 still rests above the stud 419 on the lever 350 as shown in Figs. 6 and 7. However, when the lever 350 is rocked farther clockwise by the lug 394 on the link 385 during the subtotal-taking operation while the paper carriage is in the passbook "New Balance" columnar position, the stud 419 is moved from the position of Figs. 6 and 7 to the position of Fig. 9, and the forward

hooked end of the upper arm of the latch lever 415 is moved down in front of the stud 413 by the spring 417, thus latching the lever 350 in the position of Fig. 9 where the lug 375 on the lever 350 is rearwardly of the lower end of the stem of the total key T. The total key is thus free to be depressed but the machine still cannot be operated by depression of the total key, while the carriage remains in the passbook "New Balance" columnar position, for a reason to be explained later. Regardless of the position of the paper carriage after a subtotal operation of the machine, all other means, including the subtotal key, are disabled from giving the machine a cycle of operation.

A three-armed pawl 425 (Figs. 6, 7 and 9) is pivoted on the upper portion of the lever 350 and has its lower arm connected to one end of a spring 426 which thus urges it clockwise to the position of Fig. 6, where it is held by engagement of its rearward arm on the forward end of the link 353. The upper arm of the pawl 425 is forward of the lower end of the stem of the subtotal key when the lever 350 is positioned as in Figs. 6 and 7 by movement of the paper carriage to the passbook "New Balance" columnar position. The movement of the lever 350 from its Fig. 7 position to its Fig. 9 position by the lug 394 on the link 385 occurs while the subtotal key ST is in depressed position and during this movement of the lever 350 the upper arm of the pawl 425 engages against the side of the total key stem and the pawl is rocked counterclockwise against the tension of its spring 426. Near the end of the subtotal-taking cycle, the subtotal key ST is released and restored to normal, whereupon the spring 426 rocks the pawl 425 clockwise to re-engage its rearward arm with the forward end of the link 353 and position its upper arm beneath the lower end of the stem of the subtotal key ST. The subtotal key is thus locked against being again depressed sufficiently to condition the machine for subtotal taking and to give it a cycle of operation until the lever 350 is again unlatched from the latch lever 415 and restored to normal during a total-taking cycle of operation as will be described later. Also, while the lever 350 and link 353 remain latched in the position of Fig. 9 by the latch 415, the cam 382 continues to hold the lever 382 partially depressed as in Fig. 9 so that the link 385 positions the end of the arm 386 in the path of the stud 400. As the subtotal key ST is blocked by the pawl 425 on the lever 350 and no other means except the total key T can depress the link 385, the machine cannot be given a cycle of operation by any means other than the total key following a subtotal-taking cycle.

Although the total key T is free for depression, the machine is still prevented from being operated by depression of the total key while the paper carriage remains in the passbook "New Balance" columnar position. When the lever 350 is moved from the position of Fig. 7 to the position of Fig. 9 by the lug 394 on the link 385 during the subtotal-taking cycle of the machine, the link 353 is also moved further rearwardly against the tension of the spring 354. The rear end of the link 353 has a downwardly extending projection or hook against which a stud 428 (Figs. 1 and 6) on the upper arm of a bell crank 429 pivoted on a stud 430 fixed in the machine frame is normally held by the spring 361 which urges the bell crank 429 clockwise. The lower or forward branch of the bell crank 429 engages under a stud 431 (Figs. 1, 6 and 10) in the rear arm of a bell crank 432

pivoted on the stud 241. The lower arm of the bell crank 432 has a lateral lug 433 extending in front of a stud 424 secured in the cross piece of the yoke 397. When the link 353 is moved rearwardly to the position of Fig. 9 by the lug 394 and lever 350 while the carriage remains in the passbook "New Balance" columnar position and holds the three-armed lever 360 in the position of Fig. 6, the spring 361 rocks the bell crank 429 clockwise, keeping the stud 428 in contact with the hooked rear end of the link 353. The bell crank 429 in turn rocks the bell crank 432 counterclockwise, moving the lateral projection 433 on the lower arm of the bell crank 432 to the position shown in dot-dash lines in Fig. 9, where it prevents the yoke 397 and arm 398 from being rocked counterclockwise from its Fig. 9 position by the spring 399 when the linkage 385, 386 is moved downwardly by the stud 390 on the lever 301 as the latter is rocked counterclockwise from its normal position of Fig. 9 by depression of the total key T while the paper carriage remains in the passbook "New Balance" columnar position. Thus, while the paper carriage remains in the passbook "New Balance" columnar position after the subtotal-taking operation of the machine, the forward end of the arm 398 remains behind and in the path of rearward movement of the stud 400 on the slide 401 so that the electric drive will be disconnected from the operating mechanism of the machine if it is attempted to set the machine in operation by depression of the total key T or by any other means while the paper carriage remains in that columnar position following the subtotal-taking cycle of operation.

As the example of work illustrated in Fig. 25 will require the printing of a total in the "New Balance" column of the journal sheet or strip J, the operator will manually return the paper carriage across the machine to the journal "New Balance" columnar position. Upon movement of the paper carriage out of the passbook "New Balance" columnar position the roller 372 is moved off of the cam edge 271 of the lever 369, permitting the lever to return to its normal position illustrated in dot-dash lines in Fig. 8, the link 385 to be moved downwardly, and the three-armed lever 360 to be moved clockwise by the spring 361 from the Fig. 6 position to the Fig. 1 position. In this movement of the three-armed lever 360, the end of the middle arm thereof engages the stud 428 on the bell crank 429 and rocks the bell crank counterclockwise as the distance from the point of connection of the spring 361 from the pivotal center of said lever 360 is considerably greater than the distance from the point of connection of said spring to the bell crank 429 to the pivotal center of the latter. The bell crank 429 moving counterclockwise permits the bell crank 432 to rock clockwise so that when the total key T is now depressed and the link 385 thereby lowered, the spring 399 can cause the arm 398 to follow the lug 395 downward and move its forward end below the path of the stud 400 on the slide 401.

Thus, after the paper carriage is moved out of the passbook "New Balance" columnar position following a subtotal-taking operation, the machine is free to be operated by depression of the total key T but it cannot be operated by any other means. Following the subtotal-taking operation with the paper carriage in the passbook "New Balance" columnar position, the operator is therefore compelled to move the paper carriage out of the passbook "New Balance" columnar

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position and is also then restricted to give the machine a total-taking operation before being able to operate the machine in any other way. By this means the making of a record of each passbook posting operation is enforced and any fraud which might be perpetrated by omitting to make a record of any passbook posting operation is prevented as are also any unintentional failures of the operator to complete the work in the proper way.

In some classes of work adapted to be performed on the machine of the present invention, although usually not in savings account passbook posting, negative or overdraft balances may be encountered as the result of the posting of a charge against an account exceeding the old balance in the account as illustrated in the last line of postings in Fig. 25. When the paper carriage moves to the passbook "New Balance" columnar position following the entry of the charge item in such an example of posting, the link 353 and lever 350 are moved to the Fig. 6 position as previously described. However, when a negative total is present in the register, the subtotal key, as well as the total key, is locked against depression by the slide 360 which is held in its Fig. 10 position, which is forwardly of its Fig. 1 position, by the finger 361 on the shaft 262, as previously described. With the slide in the position of Fig. 10, the overdraft release key OD is free for depression and when it is depressed, the machine is given a cycle of operation during which a "fugitive 1" is subtractively entered into the register and the slide is moved still farther forward to again lock the key OD and unlock the total and subtotal keys T and ST. Also upon depression of the overdraft release key OD, the rear arm of the lever 296 engages a lateral lug 440 (Fig. 10) on a projection on the rear arm of the bell crank 432 and rocks the bell crank counterclockwise from its Fig. 1 position to its Fig. 10 position, thus causing the lateral lug 438 on the lower arm of said bell crank to act on the pin 434 and lift the forward end of the arm 395 above the path of the stud 400 on the slide 401 so that operation of the machine by depression of the overdraft release key will not be prevented.

After the cycle of operation initiated by depression of the key OD, the machine can be operated by depression of the subtotal key in the manner and with the result already described excepting that the true negative or overdraft balance will be printed instead of a positive balance in the passbook "New Balance" columnar position.

Restoring the controls to normal following depression of total key

At the end of the subtotal-taking operation and after movement of the paper carriage out of the passbook "New Balance" position, the parts are in the position of Fig. 9 and the total key T is free for depression regardless of whether the total in the register is positive or negative. When the total key T is depressed and the lever 391 thereby rocked counterclockwise, the stud 390 is moved downwardly to the dot-dash line position in Fig. 9 so that it is positioned behind the upper end of a pawl 445 (Figs. 1, 6, 7 and 9) pivoted on a stud 446 on the forward end of the lower arm of the latch lever 415. A spring 447 normally holds the pawl 445 in the position shown with its lower arm engaged against the stud 448 on the latch lever 415. Near the end of the forward stroke of each cycle of operation of the

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machine, the stud 400 on the drive plate engages the lower arm of the pawl 445 and, except when the stud 390 is behind the upper arm of the pawl 445, the pawl is thereby rocked clockwise on the latch lever 415. The spring 392 is not sufficiently strong to rock the lever 391 against the tension of its spring 392 when the link 385 is lowered by depression of the subtotal key. However, during the total-taking cycle, when the stud 390 is behind the upper arm of the pawl 445, the pawl is prevented from rocking substantially on the latch lever 415 and, instead, the latch lever 415 and the pawl 445 are swung unitarily clockwise about the stud 416 sufficiently to raise the hooked forward end of the upper arm of the latch lever 415 above the stud 410 on the lever 350 which, together with the link 353, is immediately moved forwardly a short distance by the spring 354 until the upstanding lug 375 on the lever 350 engages the rear side of the stem of the depressed total key T, the link 353 and lever 350 being not otherwise restrained against such forward movement at that time. Although the stud 394 on the link 385 is in front of the projection 410 on the lever 350 at this time, the pitman 403 is returned forwardly to its normal position toward the end of the forward stroke of the total-taking machine cycle as described in the Horton Patent 1,853,050 so that the lower end of the linkage 385, 386 will at that time be in its normal forward position and the lug 394 will not hinder the above-mentioned counterclockwise movement of the lever 350 and forward movement of the link 353. Such counterclockwise movement of the lever 350 is sufficient to move the stud 410 under the downwardly turned end portion of the upper arm of the latch lever 415 while the latch lever is still held in releasing position by the stud 400 on the drive plate engaging the lower arm of the pawl 445.

Toward the end of the return stroke of the total-taking cycle, the total key T is released and returned to normal, whereupon the spring 354 restores the link 353 and the lever 350 to their normal positions of Fig. 1 where the upward projection 355 at the rear of the lug on the lever engages against the rear side of the subtotal key stem. The parts are then again in the normal positions of Fig. 1 and the machine is ready for the starting of a new passbook posting operation.

Normalizing

To permit the machine to be used for printing amounts, subtotals and totals with the carriage in any desired columnar position, the illustrated machine is provided with a lock (Fig. 1) comprising a lock slide 450 operable by a removable key 451 which can be retained by the proprietor or person of supervisory authority. When the key 451 is in the lock, rotation of the key in one direction moves the lock slide forward to the position of Fig. 1 where it does not interfere with the previously described operations of the various parts of the machine, but when the slide 450 is moved rearwardly by rotation of the key 451 in the other direction, a stud 452 on the slide engages an upward projection on the rear end of a slide 453 supported on a stud 454 on the lever 350 and a stud 455 on a projection on the bell crank 432. The stud 454 and 455 are received in slots in the slide 453 so that when the latter is in its forward position it will not interfere with movements of the lever 350 and bell crank 432. When the slide 453 is moved rearwardly by the lock slide 450, it pulls the lever 350 clockwise suf-

ficiently to move the lug 375 and pawl 425 rearwardly clear of the stems of the total key T and subtotal key ST and it also pulls the bell crank 432 counterclockwise sufficiently to hold the forward end of the arm 393 above the path of the stud 400 so that the machine may be operated by the + and - motor bars 170 and 171, the subtotal key ST, the total key T, the account number key 285, and the non-add key NA, with the carriage in any of its positions. Also, when the slide 453 moves rearwardly, a cam projection 456 thereon engages a stud 457 on the latch lever 415 so that, if the latch lever 415 is in latching position, it will be cammed clockwise to release the stud 419 on the lever 350. When the lock slide 450 is again moved forwardly by rotation of the key 451, the cam 456 holds the latch lever 415 in releasing position until the stud 419 on the lever 350 has moved under the end of the upper arm of the latch lever. This insures that a total-taking operation will not be enforced immediately after the machine is locked in pass-book posting condition.

Control of symbol printing

As in the machine of the Horton Patent 1,853,050, the machine illustrated herein has a symbol printing type bar 320 (Fig. 12) connected to an actuator segment 460 located at the right, viewing the machine from the front, of the actuator segment which cooperates with the units order pinions 227 and 228 of the register. The segment 460 is held in the normal position of Fig. 12, while the machine is at rest, by the actuator segment restoring bail 461 which governs the other actuator segments as described in the Horton Patent 1,853,050, and is swung counterclockwise about the shaft 459 from the position of Fig. 12 during the forward stroke, and then clockwise back to the position of Fig. 12 during the return stroke of each cycle of operation of the machine. The segment 460 is urged to follow the restoring bail 461 by a spring 462 connected to a stud 463 which is secured in the segment 460 and also engaged in the forked end of one arm of a yoke 464 rockably mounted on the shaft and having a second arm provided with a lateral lug 465.

During each machine cycle, the forward movement of the lug 465, and thus the counterclockwise movement of the segment 460 and upward movement of the symbol printing type bar 320, are controlled by a sector 470 or a lever 437 (Fig. 13), both pivoted on the stud 241. The sector 470 has a series of stepped shoulders 471, 472, 473, 474 and 475 for engagement with the lug 465. A spring 469 connected to a rearward extending arm of the sector 470 normally holds the sector in the position shown in Fig. 13 where the end of the rearward arm of the sector 470 is in engagement with a stud 477 on the rear arm of the three-armed lever 240 (Fig. 3) and the lowest and rearmost shoulder 471 thereon is in the path of and immediately in front of the lug 465, so that during any machine operation in which the sector 470 remains in such normal position, the segment 460 and symbol printing type bar 320 remain in their Fig. 12 positions and no symbol is printed as the usual printing hammer 319 (Fig. 1) for the symbol printing type bar 320 is not operated unless the symbol printing type bar is raised above its normal position when the machine is operated. Depression of the + motor bar or depression of the account number key 235 or the non-add key NA in the present machine does not cause the sector 470 to be displaced from

its Fig. 13 position. Consequently no symbol is printed to the right of the amount or account number printed in an adding or non-adding operation of the machine. However, when the - motor bar is depressed to cause a subtracting operation of the machine, the three-armed lever 240 is rocked counterclockwise to position the register control arm 232 for a subtract operation of the register as previously explained, and the stud 477 is raised and rocks the sector 470 to position its uppermost shoulder 475 in the path of the lug 465. During subtracting machine operations, therefore, the actuator segment 460 is rocked counterclockwise and the symbol printing type bar 320 is elevated until the lug 465 encounters the uppermost shoulder 475 on the sector 470, which causes the type bar to be arrested in the position where the "-" type thereon is at the printing line of the platen. The "-" character is therefore printed to the right of any amount printed in a machine cycle initiated by depression of the - motor bar.

When the subtotal key ST is depressed, the lower end of the subtotal key stem acts on the forward end of the two-armed lever 382 (Figs. 6, 7 and 15) and rocks the latter counterclockwise as previously explained. During such movement, the lower arm of the lever 382 engages a lug 473 (Fig. 15) extending laterally from the lower edge of the sector 470 and moves the sector from its normal position of Fig. 13 to the position shown in Fig. 15, where the third shoulder 473 on the sector 470 is in the path of the lug 465 and the symbol printing type bar is permitted to move up three steps from its normal position to present the type for the character "FN" at the printing line of the platen in the subtotal-taking operation. As the machine can be given a subtotal-taking operation only when the paper carriage is in the passbook "New Balance" columnar position, and the machine may not be operated in any other way while the carriage is in that columnar position, every positive balance printed in the "New Balance" column of the passbook will have the symbol "FN" printed to the right thereof.

In a positive total-taking operation, the symbol "*" is printed to the right of the total. The upper arm of the lever 382 has a lug 483 (Fig. 16) extending under the lug 384 on the link 385 so that when the lever 351 and link 385 are depressed by depression of the total key T, the lever 382 and sector 470 are rocked counterclockwise to the position of Fig. 16 where the foremost shoulder 472 of the sector is in the path of the lug 465 to arrest the symbol type bar 320 after four steps of upward movement during the total-taking machine cycle and position the "*" type thereon at the printing line.

Negative totals and subtotals are distinguished by other symbols. It will be recalled that when either the subtotal key ST or total key T is depressed to give the machine a cycle of operation, the stem of the depressed subtotal or total key depresses the forward end of the lever 292 carrying the slide 295 (Figs. 3 and 17) which, when the register contains a positive total, has the downward projection on its forward end above a stud 331 on a portion of the + motor bar stem 172 so that the machine operation is really initiated by depression of the + motor bar through the subtotal or total key if the total in the register is positive. The depression of the + motor bar does not affect the position of the sector 470 nor of any other parts controlling the in-

dexing of the symbol type bar 320. However, when the register contains a negative total, the slide 295 occupies the forward position on the lever 292 as shown in Fig. 17, and at this time the lower projection 297 on the forward end of the slide is above the stud 302 on the — motor bar stem 173. With the paper carriage in the passbook "New Balance" columnar position, and with a negative total in the register, depression of the subtotal key ST will cause a depression of the lever 292, of the slide 295, and of the — motor bar. While the slide 295 is in its forward position as illustrated in Fig. 17, a downwardly directed projection 482 at the rear end of the slide is above a stud 483 on one arm of a yoke 484 pivoted on the stud 274 and having a second arm carrying a stud 485 projecting across the upper edge of the sector 470. When the slide 295 is in its rearward positive total position, downward movement of the lever 292 and slide 295 does not affect the yoke 484, but when the lever 292 and slide 295 are moved downwardly by depression of the total or subtotal key while the slide is in its forward or negative total position, the projection 482 on the slide engages the stud 483 and rocks the yoke 484 counterclockwise so that the stud 485 depresses the sector 470 to the position shown in Fig. 17, where the uppermost shoulder on the sector is below the path of the lug 465, and the sector 470, therefore, does not limit the movement of the lug 465 and segment 460 nor control indexing of the symbol printing type bar 320 during a negative subtotal or total-taking operation of the machine.

When the lever 382 is rocked by depression of the subtotal key ST, a rearwardly extending arm 383 of the lever 382 engages a laterally extending lug 486 on a rearwardly extending arm of the lever 497 and rocks the lever 497 counterclockwise against the tension of a spring 488 connected thereto, to position the uppermost one (489) of two shoulders 489 and 490 on said lever in the path of the lug 465 as in Fig. 17. Thus, in a negative subtotal-taking operation with the paper carriage in the passbook "New Balance" columnar position, the upper shoulder 489 on the lever 497 controls the indexing of the symbol printing type bar 320 which is thereby permitted to move upwardly six steps to position the overdraft balance symbol "OD" at the printing line of the platen.

If the total key T is depressed while the register contains a negative total and the slide 295 is in its forward position, the lug 482 depresses the stud 483 and the stud 485 depresses the sector 470 so that its uppermost shoulder is below the path of the lug 465, as in a negative subtotal operation. Also, the lug 384 on the link 385 rocks the lever 382 counterclockwise as in a positive total-taking operation and not as far as said lever 382 is rocked by depression of the subtotal key ST but far enough to rock the lever 497 counterclockwise sufficiently to position its lower shoulder 490 in the path of the lug 465 as in Fig. 18 to arrest the symbol type bar 320 after five steps of movement upward in the negative total-taking cycle and thus position the type for the symbol "OD" at the printing line.

When the overdraft release key OD is depressed prior to depression of the total key or subtotal key while a negative total is present in the register, it does not in any way interfere with the above-described operations of the parts to print the symbols "OD" and "OD" for negative totals and

subtotals, respectively. The depression of the key OD does not effect any control of the symbol printing control levers except that, as it depresses the — motor bar, the sector 470 is rocked counterclockwise to position its uppermost shoulder 475 in the path of the lug 465 but the "—" symbol will not be printed because the printing mechanism is disabled, as previously explained, while the key OD is depressed.

Alongside of the operation-identifying characters, the symbol printing type bar may have type for a numeral or other character for identifying the machine by which any passbook or journal entry has been printed. In the illustrated machine, the numeral "1", turned horizontally, appears on the symbol type bar of Fig. 14 and is printed on the journal and passbook of Fig. 25.

Release key and — motor bar interlock

It is necessary to permit the — motor bar 171 to be depressed when it is necessary to depress the overdraft release key OD before depressing the subtotal key ST while the paper carriage is in the passbook "New Balance" position with a negative total in the register. When the — motor bar is depressed and rocks the three armed lever 240 counterclockwise, a link 495 (Fig. 3) connected at its rear end to the lower arm of the lever 240 is pulled rearwardly to position a stud 496 thereon rearwardly of a shoulder on a latch lever 497 pivoted on a fixed stud 498 and urged counterclockwise by a spring 499. The forward end of the lever 497 has a cam edge normally engaged by the upper side of the cross rod 220. Normally, when the machine is operated by depression of the — motor bar, the cross rod 220 moving rearwardly in the forward stroke of the machine cycle cams the lever 497 clockwise to release the stud 496 and the link 495 can immediately move forwardly sufficiently to prevent re-latching of the stud 496 by the lever 497. However, if the — motor bar were to be depressed without also depressing the key OD while the paper carriage is in the passbook "New Balance" columnar position, operation of the machine would be prevented by arrest of the stud 490 by the forward end of the arm 396 and the cross rod 230 would not be moved rearwardly far enough to unlatch the stud 496 and link 495. The lever 240 would thus be locked in subtract position and the stud 248 would prevent depression of the + motor bar, and, if the register contained a positive total, even the subtotal key ST would be locked and the machine could not be operated while the carriage remained in the passbook "New Balance" position. Although such a lockup can be released by depression of the usual error key E (Fig. 3) it is desirable to avoid it altogether.

The — motor bar stem 173 has a stud 501 (Figs. 2 and 3) cooperating with the cam edge of a lug 502 on the negative total lock slide 260. As a negative total can occur in the register only as a result of a subtraction operation, and as, during every subtracting operation, the slide 260 will be moved forwardly by the stud 501 in the motor bar stem, the finger 261 and the train of connections operating it under control of the pinion of highest order of the register are relieved of the work of moving the slide 260 forwardly against the tension of its spring 259 when the finger 261 is rocked counterclockwise (Figs. 1 and 3) upon occurrence of a negative total in the register. While the total in the register is positive, the

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overdraft release key OD is locked against depression by the slide 260. Thus, if the — motor bar could be depressed while the carriage is in the passbook "New Balance" columnar position, with a positive total in the register, it would be possible for an operator to depress the — motor bar just sufficiently to move the slide 260 forwardly to release the overdraft release key OD, whereupon the overdraft key could be depressed to operate the machine and subtractively enter a "fugitive 1" in the register notwithstanding the fact that the total in the register was positive. When the key OD is depressed, it raises the arm 398 above the stud 400 so that the machine cycle is not prevented and the link 435 and lever 240 do not become locked in subtract position. But, as a "fugitive 1" is subtractively entered in the register, the bell crank 273, 275 is rocked counterclockwise from its Fig. 3 position, as previously explained, to move the slides 260 and 298 forwardly. However, if a positive total is in the register, the finger 231 will be in its positive total position and will be engaged by an upstanding lug 500 on the slide 298 and the finger 231 will thus arrest the slide 298 and block the bell crank 273, 275 before the latter has moved the slide 260 far enough forward to unlock the total and subtotal keys, but not until the slide 260 has moved far enough forwardly to lock the overdraft release key OD. With the slide 260 held in this position, the total and subtotal keys T and ST, as well as the overdraft release key OD, are locked against operation regardless of the position of the paper carriage. To unlock the total and subtotal keys, it would be necessary for the operator to operate the machine by depression of the positive motor bar with the paper carriage in a position other than the passbook "New Balance" columnar position. In such an operation a "fugitive 1" would be added into the register as previously explained, and the bell crank 273, 275 would be rocked clockwise to its Fig. 3 position, thus permitting the slide 260 to be returned to its normal position by the spring 259, unlocking the total and subtotal keys. Then, after moving the paper carriage into the passbook "New Balance" columnar position, the machine could be operated by depression of the subtotal key. However, it is desirable to avoid also such a lockup.

To avoid such difficulties while still permitting the — motor bar to be depressed by depression of the key OD when required, the machine is provided with an interlock illustrated in Fig. 1. A latch lever 510 pivoted on a stud 511 secured in the — motor bar stem 173 has a notched lateral flange 512 (Figs. 1 and 2) at the upper end of its upper arm, and has a rearwardly extending arm carrying a stud 513 cooperating with the upper edge of the forward end of a lever 514 pivoted on the stud 241. A spring 515 yieldingly holds the stud 513 and lever 514 in engagement with each other and also holds the lever 514 against the underside of a stud 516 in the link 353. Normally, the notched portion of the flange 512 of the latch lever is aligned with a notch 517 in the side of the stem of overdraft release key OD so that the — motor bar can be depressed even though the release key may be locked against depression by the slide 260. When the paper carriage is moved to the passbook "New Balance" columnar position, the link 353 is moved rearwardly as previously explained, and the stud 516 acts on a cam projection 518 on the upper side of the lever 514 to depress the forward end of

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said lever, whereupon the spring 515 causes the latch lever 510 to rock clockwise, maintaining the stud 513 in contact with the lever 514. When the latch lever 510 thus rocks clockwise, the wide portion of the flange 512 on the upper end of the latch lever moves into the notch 517 in the stem of the overdraft release key OD, so that while the paper carriage is in the passbook "New Balance" columnar position, the — motor bar cannot be depressed if the overdraft release key is locked against depression because the register contains a positive total. However, if the register should contain a negative total when the paper carriage is moved into the passbook "New Balance" columnar position, the finger 231 will be in a position counterclockwise from that shown in Fig. 1, holding the slide 298 forwardly in a position to permit depression of the overdraft release key OD, and a stud 513 on a forward extension of the finger 231 will be behind a shoulder 523 on the latch lever 510 and hold it in the position of Fig. 1 where the notch in its lateral flange 512 is aligned with the notch 517 in the side of the overdraft key stem so that the — motor bar is not latched to the overdraft release key.

Modified form of invention

One difference between the previously described form of the invention and the modified form of the invention described hereinafter consists in the fact that the modified machine may be operated by depression of the total key at any time excepting when the paper carriage is in the passbook "New Balance" columnar position. Operation of the machine by depression of the total key, following a subtotal-taking cycle of machine, is still enforced in the modified form of the invention, but the fact that the total key may be used for giving the machine a total-taking cycle of operation when the paper carriage is in a position other than the passbook "New Balance" columnar position (for example, when the paper carriage is in the journal "New Balance" columnar position) increases the usefulness of the machine without sacrificing any of the advantages of the first-described form of the invention. More particularly, a machine equipped with the modified form of the invention may be used by the operator for totaling a list of figures at any time without requiring the person having possession of the key 481 for the lock 450 to unlock the machine for use in ordinary calculating machine work.

In the total-taking operation which terminates a passbook posting operation, the paper carriage tabulates into the journal "Account Number" columnar position. To print and total a series of figures, it will be convenient for the operator to return the paper carriage to the journal "New Balance" columnar position, where a line-spacing control stud 125 on the paper carriage renders the automatic line-spacing mechanism effective for automatic line spacing of the left-hand or journal section of the platen in each machine cycle. With the carriage in the journal "New Balance" columnar position, the operator may move the lever 70 clockwise from its Fig. 1 position to normalize or disable the automatic carriage tabulating mechanism of the machine as previously described, so that the paper carriage will remain in the journal "New Balance" columnar position for as many machine cycles as desired. The operator may then operate the machine by depressing the + motor bar or — bar accordingly as each successive fig-

ure entered on the keyboard is to be added or subtracted. The added and/or subtracted figures will be printed each below the previous one in the "New Balance" column of the journal sheet or strip. After the desired series of figures has thus been entered in the register, the total key T may be depressed to obtain the total.

In connection with special machines which embody automatic controls particularly adapted for any kind of special work, it is usually very advantageous to be able to use such a machine for ordinary adding and/or subtracting operations whenever such ordinary operations are required to be performed and so as to avoid the need of an ordinary subtracting or adding machine in addition to the special machine. However, in the present case the advantage of being able to use the machine equipped with the present invention for ordinary work in totaling a series of positive and/or negative items is of more than usual importance because an operator such as a savings account teller in a bank by whom the present machine is to be used not only is frequently required to total various lists of items in connection with the passbook posting work, but also should, as a matter of practice, use a calculating machine for totaling even very simple and easily totaled groups of items. For example, a customer may present for deposit a plurality of checks and sometimes an amount of currency as well. Regardless of whether the totaling of the amounts of the several items is easy or difficult, the teller should, as a regular practice, perform the work on a calculating machine. The teller, therefore, should have a machine which is continuously available for that kind of work and it is highly desirable not to require a second machine at the teller's window, not only because of the cost of the machine but also because of the space which would be taken up by the second machine. It is also very desirable that the records of such calculations should appear in the proper positions in the journal record of the passbook posting work.

A machine equipped with the modified form of the invention disclosed herein provides the above-mentioned advantages as is illustrated following the second line of postings in Fig. 25. Let us assume that a customer appearing at a savings account teller's window presents three checks for \$50.00, \$10.00 and \$5.00 for deposit. The teller having a machine equipped with the second form of the invention available at his window will manually move the paper carriage to the journal "New Balance" columnar position, if the carriage is not already in that position, and move the normalizing lever 70 clockwise (Fig. 1), which disables the automatic carriage tabulating means of the machine. The teller will then enter the items of 50.00, 10.00 and 5.00, one after the other, on the keyboard of the machine and operate the machine by depression of the + motor bar after the entering of each of the items on the keyboard. After operating the machine to add the last item of 5.00, the operator will return the normalizing lever 70 counterclockwise to its Fig. 1 position and depress the total key T, which will give the machine a cycle of operation in which the total, 65.00, will be printed below the items 50.00, 10.00 and 5.00 in the "New Balance" column of the journal sheet or strip J, after which the paper carriage will automatically tabulate to the "Account Number" columnar position. The operator will then enter on the keyboard of the machine the account number

appearing on the passbook presented by the customer and operate the machine by depression of the key 285, which will give the machine a cycle of operation in which the account number will be printed and the carriage will tabulate to the "Pick-Up" columnar position, after which the teller will enter the last balance appearing in the passbook on the keyboard and operate the machine by depression of the + motor bar, assuming that such last balance is a positive balance, such as \$115.00, as appears in Fig. 25. During this cycle the "pick-up" balance will be printed in the "Pick-Up" column of the journal sheet or strip J and the carriage will tabulate to the passbook "Withdrawal" column, from which the operator will manually tabulate the carriage by manipulation of the lever 92 to the "Deposit" column. Then the operator will enter on the keyboard the 65.00 total which was printed by the machine in the journal "New Balance" column as the total of the checks present for deposit. The operator will then operate the machine by depression of the + motor bar to cause the amount deposited, 65.00, to be printed in the "Deposit" column of the passbook B, after which the carriage will tabulate to the passbook "New Balance" and "Date" columnar positions.

With the paper carriage in the passbook "New Balance" columnar position, the machine equipped with the modified form of the invention, as in the case of the machine equipped with the first-described form of the invention, can be operated only by depression of the subtotal key ST, the total in the register being a positive total. Upon depression of the subtotal key, the date and new balance are printed in the "Date" and "New Balance" columns of the passbook B and, as the subtotal key ST also is locked against depression after that operation of the machine, the operator is required to move the paper carriage out of the passbook "New Balance" columnar position and will move the paper carriage to the journal "New Balance" columnar position and then give the machine a cycle of operation by depression of the total key T. As in the case of the machine provided with the first-described form of the invention, the machine provided with the modified form of the invention can be operated only by depression of the total key T when the paper carriage is moved out of the passbook "New Balance" columnar position following a subtotal-taking operation with the paper carriage in the latter columnar position. During this operation the total of 180.00 is printed in the "New Balance" column of the journal sheet or strip J and the line of passbook posting is thus completed.

Thus, as is illustrated in Fig. 25, the teller has been able to use the machine for the work of totaling a list of items, as well as for the passbook posting work per se without sacrifice of any of the advantages of the machine equipped with the first form of the invention. However, in order to clearly distinguish the totals printed on the journal sheet or strip J in completing passbook posting operations following the printing of subtotals in the "New Balance" columns of passbooks from all other totals which may be printed on the journal sheet or strip, and also to prevent frauds from being effected by preventing the printing of the total in the journal "New Balance" columnar position in the enforced completion of a passbook posting operation and subsequently printing in the journal "New Balance" columnar position a total entered

in the register of the machine by an operation effected by depression of one of the motor bars while the amount thus entered is also prevented from being printed, the machine equipped with the modified form of the invention is also provided with means which automatically prints certain predetermined positive and negative total symbols at the right of totals which are printed in the enforced completion of passbook posting operations but automatically prints other predetermined positive and negative total symbols when totals are printed otherwise than following a subtotal-taking operation of the machine with the paper carriage in the passbook "New Balance" columnar position. This is illustrated in Fig. 25 where each of the first, second, fourth and sixth totals printed in the journal "New Balance" column are designated by the symbol "*", whereas the third and fifth totals, being the totals of the two lists of items printed in the same column, are designated by the symbol "TOT" in the case of the positive third total and by the symbol "TOT" in the case of the negative fifth total. In the last line of passbook posting entries appearing in Fig. 25, a negative passbook posting balance of 25.00 appearing in the journal "New Balance" column is designated by the symbol "OD—" and thus distinguished from the negative total of the second list of items which is printed and totaled in the journal "New Balance" column.

Permitting operation of machine by depression of total key with paper carriage in position other than passbook New Balance column

In describing the modified form of the invention, elements which are also present in the first-described form of the invention will be identified in Figs. 19 to 24 by the same reference numbers by which they were identified previously. In the modified form of the invention, the lever 350 and link 353 are controlled by the paper carriage in the same manner as in the machine equipped with the first form of the invention. However, in the modified form of the invention, the forward upstanding lug 375x (Fig. 19) on the lever 350 does not extend as far rearwardly as the lug 375 on the lever 350 in the first-described form of the invention. While the paper carriage is out of the passbook "New Balance" columnar position, the lug 375x occupies the position illustrated in dot-dash lines in Fig. 19, and the total key may be depressed and the machine thereby given a total-taking cycle of operation with the carriage in any position except the passbook "New Balance" position. When the total key is so depressed following a machine operation other than a subtotal-taking operation, the lower end of the total key stem will move down behind the lug 375x on the lever 350 and the latter cannot be rocked clockwise from its Fig. 19 position during the ensuing total-taking machine operation. It is, therefore, also necessary in the modified form of the invention to prevent the lug 394 on the link 335 from acting on the lever 350 during the total-taking cycle of operation. For this reason, the lever 350 is not provided with the forwardly extending projection 410 adapted to cooperate with the lug 394 on the link 335 as in the first form of the invention, but a pawl 525 is pivoted on the lever 331 which is rocked counterclockwise by the depression of the total key T. This pawl 525 has on its lower extremity a widened portion 526 which is continuously held in contact with a stud 527 on the lever 350 by a

spring 528 in all positions of the levers 391 and 350. The forward edge of the widened lower end portion 526 of the pawl 525 is normally below the path of rearward movement of the lug 394 on the link 335. When the subtotal key ST is depressed, the lever 391 is not rocked, though the link 335 is depressed as in the first-described form of the invention, and the lug 394 on the link is thereby placed in front of the lower widened end portion 526 of the pawl 525 and will act thereon to rock the lever 350 clockwise in a subtotal-taking cycle of operation, and thus move the lever 350 to its rearward latched position during the subtotal-taking cycle, just as in the first form of the invention. However, when the total key T is depressed, the lever 391 is rocked counterclockwise so that not only the link 335 and its lug 394, but also the pawl 525, are depressed and the lower widened end portion 526 of the pawl remains below the path of rearward movement of the lug 394, which, therefore, passes above the portion 526 of the pawl during the total-taking cycle without rocking it and the lever 350 rearwardly. Thus no difficulty is encountered by the presence of the total key stem in front of the lug 375x on the lever 350 during a total-taking cycle following an operation other than a subtotal-taking operation.

In the total-taking cycle of operation following the subtotal-taking cycle of operation in which, as in the first-described form of the invention, the lever 350 is moved to and left in a rearward latched position corresponding to the position of the lever 350 shown in Fig. 9, the release pawl 445 is acted upon by the roller stud 493 on the drive plate 484, while rocking thereof on the latch lever 415 is blocked by the stud 390 on the lever 391 and the latch 415 is moved to release the lever 350 for return to normal position just as in the total-taking cycle of the machine equipped with the first-described form of the invention.

As the total key T may be depressed at any time while the paper carriage is in any position other than the passbook "New Balance" columnar position, it would be possible, in the absence of provisions to prevent it, for the operator to depress the total key T partially and only sufficiently to place the lower end of its stem in front of the lug 375x on the lever 350, while the paper carriage is in a position other than the passbook "New Balance" columnar position, and then shift the paper carriage to the latter columnar position and thereafter complete the depression of the total key T to give the machine a cycle of operation in which a total rather than a subtotal would be printed in the passbook "New Balance" column. To prevent such an operation, a lever 530 is pivoted on a stud 531 on the three-armed lever 335. The lever 530 has a rearward branch 532 extending downwardly in front of and under the stud 421 on the bell crank 432 and a forwardly extending cam finger 533 positioned under a stud 534 on the link 353. Normally, the lever 530 does not contact with either stud 431 or 524. However, if the total key T is in a partially depressed position with its stem in front of the lug 375x on the lever 350 as in Fig. 19, so that the link 335, the stud 356 and arm 357 cannot follow the three-armed lever 335 when it moves to the position in Fig. 19 as the paper carriage moves into the passbook "New Balance" columnar position, the cam finger 533 of the lever 530 will engage the stud 534 on the link 353 and, as the pivot stud 531 of the lever 530 is moved to the position

of Fig. 19, while the link 353 and stud 534 remain stationary, the lever 530 will be cammed counterclockwise to the position of Fig. 19, and its rearward branch 532 will engage the stud 431 and rock the bell crank 432 counterclockwise to the position of Fig. 19, thereby rocking the arm 396 from its lower total-taking position, where its front end is below the stud 400 on the slide 401, to the position in Fig. 19 where its forward end is in the path of the stud 400. With the parts so positioned, the drive-disconnecting means will be effective to prevent the machine from being given a cycle of operation by completion of the depression of the total key.

In the modified form of the invention, it is not necessary to provide any means, such as the lock and slide 453 of the first-described form of the invention, to permit the machine to be used for printing and totaling columns of figures. Consequently, the subtotal key ST will remain locked by the lug 355 on the lever 350 at all times when the carriage is not in the passbook "New Balance" position except immediately following a subtotal-taking operation performed with the carriage in the pass-book "New Balance" columnar position at which time the machine can be operated only by depressing the total key with the carriage out of the pass-book "New Balance" columnar position and the subtotal key is locked by the pawl 425 until after the lever 350 is unlatched and returned to normal in such a total-taking operation. As the machine cannot be operated by the subtotal key except once during each series of passbook posting operations after which the machine can be operated only for the printing of a total with a symbol identifying it as an enforced total completing a passbook posting, the subtotal counter 310 (Fig. 1) will contain a correct count of passbook postings which can be checked against the number of enforced totals printed on the journal. In other words, as the printing of a total identified in a particular way (by an "*" or an "OD" imprint) is enforced after each operation of the machine by the subtotal key, the number of such enforced total-taking operations performed on the machine will equal the count shown by the counter 310 if the work performed on the machine has been properly completed. The presence of a lesser number of totals properly identified (by "*" or "OD") on the journal will conclusively show that a posting has not been completed and/or the machine has been given one or more enforced total-taking operations without printing the totals on the journal. The counter 310 may be enclosed by a hinged cover 537 which can be locked in closed position by a lock controlled by a removable key 538 so that access to the counter can be had only by the possessor of the key.

Control of symbol printing

In the modified form of the invention, the control of symbol printing in adding, subtracting and positive and negative subtotal-taking operations, as well as in the positive and negative total operations which immediately follow subtotal-taking operations, is the same as in the first form of the invention with the single exception that the lower shoulder 490 on the lever 487 is placed one step forwardly of the upper shoulder 489 as in Fig. 21 instead of one step rearwardly of the upper shoulder 489, as in Figs. 13, 17 and 18, and the negative total symbol "OD" for negative totals printed immediately after negative sub-

the symbol printing type bar 320x, as shown in Fig. 22. As, in the modified form of the invention, a total may be taken at any time while the paper carriage is not in the passbook "New Balance" columnar position, and thus may be taken immediately following operations other than subtotal-taking operations, and as it is desired to distinguish positive and negative totals taken after operations other than subtotal-taking operations from totals taken directly after subtotal-taking operations, it is necessary to employ two additional symbols. The symbol "TOT" for positive totals taken after operations other than subtotal-taking operations is placed on the third space from the top of the symbol printing type bar 320x, which space is vacant on the type bar 320 of Fig. 14. The symbol "TOT," for negative totals taken after operations other than subtotal-taking operations is placed in the sixth position from the top of the symbol printing type bar 320x, which space, on the type bar 320 of Fig. 14, is occupied by symbol "OD" for negative totals taken directly after subtotal-taking operations.

For controlling the lug 465 so as to position these two added symbols "TOT" and "TOT" at the printing line platen in positive and negative total-taking operations following other than subtotal-taking operations, a third lever 540 (Fig. 21) is pivoted on the stud 241 and carries a stud 541 (Fig. 23) which is normally held in engagement with the upper end of a lug 542, extending upwardly from the lever 391, by spring 543 connected between said stud 541 and the lever 391. As the spring 392 holds the lever 391 in its normal position where its lug 542 holds the forward end of the lever 540 entirely above the path of the lug 465, neither of two shoulders 544 and 545 will be positioned in the path of the lug 465 except when the total key T is depressed for a total-taking operation.

The lever 540 also has an upwardly extending rear arm 546 positioned behind a stud 547 on the link 353. When the paper carriage is in a position other than the passbook "New Balance" columnar position, following a machine operation other than a subtotal-taking operation, and the link 353 is, therefore, in its normal forward position, the stud 547 is a substantial distance in front of the arm 546, as shown in Fig. 23. It will be remembered, however, that when the paper carriage is moved to the passbook "New Balance" columnar position, the link 353 moves rearwardly and, during the subtotal-taking operation, with the paper carriage in that position, the lever 350 and link 353 are moved still farther rearwardly and latched in such rearmost position. In this latched position of the lever 350 and link 353, the stud 547 engages the arm 546 of the lever 540 and holds the forward end of said lever upwardly out of the path of the lug 465, so that neither shoulder of the lever 540 will interfere with movements of the lug 465 during a total-taking operation which follows such a subtotal-taking operation and while the link 353, therefore, remains latched in its rearward position. Positive and negative totals which are printed in operations immediately following subtotal-taking operations will, therefore, be identified by the same symbols "*" and "OD," respectively, as in the first-described form of the invention.

It will also be remembered that when a total is taken immediately after a subtotal, the lever 350 and link 353 are unlatched and permitted to return to their normal forward positions. Then the stud 547 is considerably in front of the arm

546, so that if the total key T is depressed to take a total following an operation other than a subtotal-taking operation, the stud will not prevent the lever 540 from following the lever 391. If the register contains a positive total at that time, the stud 541 on the lever 540 will remain in contact with the lug 542 on the lever 391 when the latter is moved to the position shown in Fig. 23 by the depressed total key T. In that position of the lever 540, its rearward upper shoulder 544 is in the path of the lug 465 and will limit the latter at such a point as to position symbol "TOT" in the third position on the type bar 320x at the printing line. If, however, the register contains a negative total, the slide 295 will be in its forward position, as in Fig. 24, where the lug 462 on its rear end will act on the stud 453 on the yoke 484 when the total key is depressed, and the stud 485 on the other arm of the yoke will not only depress the sector 470 entirely out of the path of the lug 465, but will also be positioned below a shoulder 550 on the lever 540 so as to arrest the latter, in its counterclockwise movement, at a point where the front lower shoulder 545 of the lever 540 is in the path of the lug 465 and will, during the ensuing negative total-taking operation, arrest the lug 465 at a point where the type for the symbol "TOT" in the sixth position on the symbol printing type bar 320x will be positioned at the printing line.

Thus it will be seen that when either a positive or a negative enforced total is taken immediately after a subtotal-taking operation to complete the passbook posting operation, the appropriate one of a pair of positive and negative total symbols "*" and "OD" will be printed to the right of the total, but if either a positive or a negative total is taken after any operation of the machine other than a subtotal-taking operation, the appropriate one of a different pair of positive and negative total symbols "TOT" and "TOT" will be printed to the right of the total. The journal sheet or strip J printed by the machine will, therefore, show, with respect to each total printed thereon, whether that total was printed in completing a passbook posting operation, or was printed otherwise than in connection with a passbook posting operation.

— Motor bar lock

In either form of the invention, the latch lever 510 of Fig. 1 may be replaced by a different form of latch lever which will prevent depression of the — motor bar while the paper carriage is in the passbook "New Balance" columnar position unless the register contains a negative total. This modified form of latch lever 560 is shown in Fig. 19, and is pivoted on the stud 511 in the stem 173 of the — motor bar. This latch lever 560 also has a rearwardly extending arm (Fig. 20) carrying a stud 512 which is normally held in contact with the upper edge of the forward end of the lever 514 by the spring 515. The latch lever 560, however, has an upwardly extending arm 561 with a shoulder 562 adapted to cooperate with a lateral lug 563 on a member 564 fixedly mounted on the studs 174 and 175 on which the + and — motor bars are guided.

Normally, the shoulder 562 on the latch lever is forwardly of the lug 563, but when the forward end of the lever 514 is depressed as the paper carriage moves into the passbook "New Balance" columnar position, the latch lever 560 is rocked clockwise to position its shoulder 562 over the lug 563, thereby locking the — motor bar against

depression in the passbook "New Balance" columnar position of the carriage, if the register contains a positive total. If, however, the register contains a negative total, the stud 512 on the forward extension of the finger 291 is positioned behind a wide portion of a projection 565 on the latch lever 560 and so prevents it from rocking to latching position as the paper carriage moves into the passbook "New Balance" columnar position. The latch lever 560 does not at any time latch the — motor bar to the overdraft key OD.

While the forms of mechanisms above described and illustrated in the accompanying drawings are admirably adapted to the purposes of the invention, it will be apparent that invention is susceptible of embodiment in various types of calculating machines and that the mechanism may be modified in various ways.

I claim:

20 1. A machine of the class specified having means for driving it through cycles of operation, registering mechanism, means for entering amounts into and taking subtotals and totals from said registering mechanism, a manipulative subtotal-taking control means, a manipulative total-taking control means, an element actuated from said driving means in cycles of operation of said machine, means to prevent operation of the machine, said preventing means having a portion
25 conditioned solely by said subtotal-taking control means to condition said preventing means by manipulation of said subtotal-taking control means for operation by said element in a subtotal-taking cycle of the machine to enable said
30 preventing means to prevent a further cycle of operation of the machine, and means controlled by said total-taking control means alone to disable said preventing means.

2. A machine of the class specified, having a plurality of manipulative function control means, driving means controlled by each of said manipulative means to cause it to drive said machine through cycles of operation, elements actuated from said driving means in machine cycles, and
45 normally ineffective means conditioned by one of said manipulative function control means, when manipulated, and operated by one of said elements in the ensuing machine cycle to disable all but another one of said manipulative means
50 from causing said driving means to drive said machine through further cycles of operation, and means conditioned by said other one of said manipulative means, when manipulated, and operated by one of said elements in the ensuing
55 machine cycle, to restore said disabling means to ineffective condition.

3. A machine as defined in claim 2 including a registering mechanism and means for entering amounts in and drawing sub-totals and totals
60 from said registering mechanism, and wherein said manipulative function control means includes a subtotal-taking control means, a total-taking control means and at least one other manipulative control means, said machine being further characterized in that said one manipulative
65 means is said subtotal-taking control means and in that said other one of said manipulative means is said total-taking control means.

4. A machine of the class specified having at least three manipulative control members, driving means controlled by said members to cause
70 said driving means to drive said machine through cycles of operation, means normally effective to disable one of said manipulative members from causing said machine to be driven through a
75

cycle of operation, normally ineffective means to disable the other manipulative members from causing said machine to be driven through cycles of operation, an element actuated from said driving means in machine cycles, and means conditioned by a single one of said other manipulative members when manipulated and controlled by said element to render said normally effective disabling means ineffective and place said normally ineffective disabling means in an effective condition.

5. A machine of the class specified having a registering mechanism, means to enter amounts into and draw subtotals and totals from said registering mechanism, a manipulative subtotal-taking control means, a manipulative total-taking control means, at least one other manipulative control means, driving means controlled by each of said control means to cause said driving means to drive said machine through cycles of operation, means normally effective to disable said total-taking control means from causing said machine to be driven through a cycle of operation, normally ineffective means to disable said subtotal-taking control means and said other manipulative control means from causing said machine to be driven through cycles of operation, an element actuated from said driving means in machine cycles, means conditioned by said subtotal-taking control means, when in subtotal-taking condition, and controlled by said element to render said normally effective disabling means ineffective and said normally ineffective disabling means effective, and means conditioned by said total-taking control means, when in total-taking condition, to restore said disabling means to their normal conditions.

6. A machine of the class specified, having a traveling carriage, means controlled by said carriage in accordance with the positions thereof, at least three manipulative control members, driving means controlled by said control members, when manipulated, to cause said driving means to drive said machine through cycles of operation, means to disable one of said manipulative members from causing the machine to be driven through a cycle of operation by said driving means, said disabling means being controlled by said carriage controlled means and thereby rendered ineffective in a predetermined position of the carriage and effective in other positions of the carriage, and means conditioned by said one of said manipulative members, when manipulated, to disable all but one of said other manipulative members from causing said driving means to drive said machine through cycles of operation.

7. A machine of the class specified having a traveling carriage, means controlled by said carriage in accordance with the positions thereof, registering mechanism, means to enter amounts into and draw subtotals and totals from said registering mechanism, a manipulative subtotal-taking control means, a manipulative total-taking control means, further manipulative control means, driving means controlled by each of said control means to cause said driving means to drive said machine through cycles of operation, means to disable said subtotal-taking control means from causing the machine to be driven through a cycle of operation by said driving means, said disabling means being controlled by said carriage controlled means and thereby rendered ineffective in a predetermined position of the carriage and effective in other positions of the carriage, an element actuated from said driv-

ing means in machine cycles, and means conditioned by said subtotal-taking control means, when in subtotal-taking condition, and controlled by said element to disable said subtotal-taking control means and said further manipulative control means from causing said driving means to drive said machine through further cycles of operation.

8. A machine of the class specified having a traveling carriage, means controlled by said carriage in accordance with the positions thereof, registering mechanism, means to enter amounts into and draw subtotals and totals from said registering mechanism, a manipulative subtotal-taking control means, a manipulative total-taking control means, further manipulative control means, driving means controlled by each of said control means to cause said driving means to drive said machine through cycles of operation, means to disable said subtotal-taking control means from causing the machine to be driven through a cycle of operation by said driving means, means movable by said carriage controlled means to render said disabling means ineffective in a predetermined position of the carriage and effective in other positions of the carriage, means to disable said further manipulative control means from causing said driving means to drive said machine through cycles of operation and controlled by said carriage controlled means through an element movable thereby to be placed in effective condition when said carriage is in said predetermined position and urged to return to ineffective condition when said carriage is in another position, means for retaining said last-mentioned disabling means in effective condition, an element actuated from said driving means in machine cycles, means conditioned by said subtotal-taking control means, when in subtotal-taking condition, and controlled by said element to cause said last-mentioned disabling means to be retained in effective condition by said retaining means, and means conditioned by said total-taking control means, when in total-taking condition, to disable said retaining means.

9. A machine of the class specified, having a traveling carriage, means controlled by said carriage in accordance with the positions thereof, at least three manipulative control members, driving means controlled by said control members, when manipulated, to cause said driving means to drive said machine through cycles of operation, means to disable a first one of said manipulative members from causing the machine to be driven through a cycle of operation by said driving means, means movable by said carriage controlled means to render said disabling means ineffective in a predetermined position of the carriage and effective in other positions of the carriage, normally effective means for disabling a second one of said manipulative members from causing the machine to be driven through a cycle of operation by said driving means, normally ineffective means for disabling the remainder of said manipulative members from causing the machine to be driven through a cycle of operation by said driving means, an element operated from said driving means in machine cycles, and means conditioned by said first one of said manipulative members, when manipulated, and controlled by said element to render said first-mentioned disabling means and said normally ineffective disabling means effective and render said normally effective disabling means ineffective.

10. A machine of the class specified, having a

traveling carriage, means controlled by said carriage in accordance with the positions thereof, registering mechanism, means to enter amounts into and draw subtotals and totals from said registering mechanism, a manipulative subtotal-taking control means, a manipulative total-taking control means, further manipulative control means, driving means controlled by each of said control means to cause said driving means to drive said machine through cycles of operation, means to disable said subtotal-taking control means from causing the machine to be driven through a cycle of operation by said driving means, means movable by said carriage controlled means to render said disabling means ineffective in a predetermined position of the carriage and effective in other positions of the carriage, normally effective means for disabling said total-taking control means from causing the machine to be driven through a cycle of operation by said driving means, normally ineffective means for disabling said further manipulative control means from causing the machine to be driven through a cycle of operation by said driving means, an element operated from said driving means in machine cycles, means conditioned by said subtotal-taking control means, when in subtotal-taking condition, and controlled by said element to render said first-mentioned disabling means and said normally ineffective disabling means effective and render said normally effective disabling means ineffective, and means conditioned by said total-taking control means, when in total-taking condition, to restore said first-mentioned disabling means to control by said carriage and restore said normally effective disabling means and normally ineffective disabling means to their normal conditions.

11. A machine of the class specified, having a traveling carriage, means controlled by said carriage in accordance with the positions thereof, at least three manipulative control members, driving means controlled by said control members, when manipulated, to cause said driving means to drive said machine through cycles of operation, means to disable a first one of said manipulative members from causing the machine to be driven through a cycle of operation by said driving means and means movable by said carriage controlled means to render said disabling means ineffective in a predetermined position of the carriage and effective in other positions of the carriage, normally ineffective means for disabling a second one of said manipulative members from causing the machine to be driven through a cycle of operation by said driving means, and controlled by said carriage controlled means through an element movable thereby and thereby rendered effective when said carriage is in said predetermined position but ineffective when said carriage is in another position, normally ineffective means for disabling the remainder of said manipulative members from causing the machine to be driven through a cycle of operation by said driving means, an element operated from said driving means in machine cycles, and means conditioned by said first one of said manipulative members, when manipulated, and controlled by said element to render said first-mentioned disabling means and the second-mentioned of said normally ineffective disabling means effective.

12. A machine of the class specified, having a traveling carriage, means controlled by said carriage in accordance with the positions thereof,

registering mechanism, means to enter amounts into and draw subtotals and totals from said registering mechanism, a manipulative subtotal-taking control means, a manipulative total-taking control means, further manipulative control means, driving means controlled by each of said control means to cause said driving means to drive said machine through cycles of operation, means to disable said subtotal-taking control means from causing the machine to be driven through a cycle of operation by said driving means and means movable by said carriage controlled means to render said disabling means ineffective in a predetermined position of the carriage and effective in other positions of the carriage, normally ineffective means for disabling said total-taking control means from causing the machine to be driven through a cycle of operation by said driving means and controlled by said carriage controlled means through an element movable thereby and thereby rendered effective when said carriage is in said predetermined position but ineffective when said carriage is in another position, normally ineffective means for disabling said further manipulative control means from causing the machine to be driven through a cycle of operation by said driving means, an element operated from said driving means in machine cycles, means conditioned by said subtotal-taking control means, when in subtotal-taking condition, and controlled by said element to render said first-mentioned disabling means and the second-mentioned of said normally ineffective disabling means effective, and means conditioned by said total-taking control means, when in total-taking condition, to restore said first-mentioned disabling means to control by said carriage and restore the second mentioned of said normally ineffective disabling means to normal condition.

13. A machine of the class specified, having a traveling carriage, means controlled by said carriage in accordance with the positions thereof, at least three manipulative control members, driving means controlled by said control members, when manipulated, to cause said driving means to drive said machine through cycles of operation, means to disable one of said manipulative members from causing the machine to be driven through a cycle of operation by said driving means, said disabling means being controlled by said carriage controlled means and thereby rendered ineffective in a predetermined position of the carriage and effective in other positions of the carriage, means conditioned by said one of said manipulative members, when manipulated, to disable the remaining manipulative members from causing said driving means to drive said machine through cycles of operation, means operable by one of said remaining manipulative members when manipulated, to place said last-mentioned disabling means in a non-disabling condition, and means controlled by said carriage controlled means to prevent said last mentioned disabling means from being placed in non-disabling condition by said last mentioned manipulative member while said carriage is in said predetermined position.

14. A machine of the class specified having a traveling carriage, means controlled by said carriage in accordance with the positions thereof, registering mechanism, means to enter amounts into and draw subtotals and totals from said registering mechanism, a manipulative subtotal-taking

ing control means, a manipulative total-taking control means, further manipulative control means, driving means controlled by each of said control means to cause said driving means to drive said machine through cycles of operation, means to disable said subtotal-taking control means from causing the machine to be driven through a cycle of operation by said driving means, said disabling means being controlled by said carriage controlled means thereby rendered ineffective in a predetermined position of the carriage and effective in other positions of the carriage, an element actuated from said driving means in machine cycles, normally ineffective means conditioned by said subtotal-taking control means, when in subtotal-taking condition, and controlled by said element to disable said subtotal-taking control means, said total-taking control means and said further manipulative control means from causing said driving means to drive said machine through further cycles of operation, means operable by said total-taking control means to place said last-mentioned disabling means in a non-disabling condition, means controlled by said carriage controlled means to prevent said last-mentioned disabling means from being placed in non-disabling condition by said total-taking control means while said carriage is in said predetermined position, and means conditioned by said total-taking control means, when in total-taking condition, to restore said last-mentioned disabling means to its normal ineffective condition.

15. A machine of the class specified, having a traveling carriage, means controlled by said carriage in accordance with the positions thereof, at least three manipulative control members, driving means controlled by said control members, when manipulated, to cause said driving means to drive said machine through cycles of operation, means to disable a first one of said manipulative members from causing the machine to be driven through a cycle of operation by said driving means, said disabling means being controlled by said carriage controlled means and thereby rendered ineffective in a predetermined position of the carriage and effective in other positions of the carriage, normally effective means for disabling a second one of said manipulative members from causing the machine to be driven through a cycle of operation by said driving means, normally ineffective means for disabling the remainder of said manipulative members and said second manipulative member from causing the machine to be driven through a cycle of operation by said driving means, said normally ineffective disabling means being controlled by said carriage-controlled means to be rendered effective when said carriage enters said predetermined position, an element operated from said driving means in machine cycles, and means conditioned by said first one of said manipulative members, when manipulated, and controlled by said element to render said first-mentioned disabling means effective while said carriage is in said predetermined position and render said normally effective disabling means ineffective.

16. A machine of the class specified having a traveling carriage, means controlled by said carriage in accordance with the positions thereof, registering mechanism, means to enter amounts into and draw subtotals and totals from said registering mechanism, a manipulative subtotal-taking control means, a manipulative total-taking control means, further manipulative control means, driving means controlled by each of said

control means to cause said driving means to drive said machine through cycles of operation, a first disabling means to disable said subtotal-taking control means from causing said machine to be driven through a cycle of operation by said driving means, a second disabling means to disable said total-taking control means from causing said machine to be driven through a cycle of operation by said driving means, a third disabling means to disable said further manipulative means from causing said machine to be driven through a cycle of operation by said driving means, means controlled by said carriage controlled means to place said first disabling means in effective position and said third disabling means in ineffective position except when said carriage is in a predetermined position and place said second disabling means in disabling condition when said carriage is in said predetermined position, an element actuated from said driving means in machine cycles, means conditioned by said subtotal-taking control means, when in subtotal-taking condition, and controlled by said element to place said first disabling means in a disabling condition, to place said second disabling means in a non-disabling condition, and to retain said third disabling means in disabling condition regardless of change of the position of said carriage, means controlled by said carriage-controlled means to render said third disabling means effective to disable said total-taking control means from causing said machine to be driven through a cycle of operation by said driving means while said carriage is in said predetermined position, and means conditioned by said total-taking control means, when in total-taking condition, to disable said retaining means and return all of said disabling means to their normal conditions.

17. A machine of the class specified having a traveling carriage, means controlled by said carriage in accordance with the positions thereof, registering mechanism, means to enter amounts into and draw subtotals and totals from said registering mechanism, a manipulative subtotal-taking control means, a manipulative total-taking control means, further manipulative control means, driving means controlled by each of said control means to cause said driving means to drive said machine through cycles of operation, a first disabling means to disable said subtotal-taking control means from causing said machine to be driven through a cycle of operation by said driving means, a second disabling means to normally disable said total-taking control means from causing said machine to be driven through a cycle of operation by said driving means, a third disabling means to disable said further manipulative means from causing said machine to be driven through a cycle of operation by said driving means, means controlled by said carriage to place said first disabling means in effective position and said third disabling means in ineffective position except when said carriage is in a predetermined position, an element actuated from said driving means in machine cycles, means conditioned by said subtotal-taking control means, when in subtotal-taking condition, and controlled by said element to place said first disabling means in a disabling condition, to place said second disabling means in a non-disabling condition, and to retain said third disabling means in disabling condition regardless of change of the position of said carriage, means controlled by said carriage-controlled means to render said

third disabling means effective to disable said total-taking control means from causing said machine to be driven through a cycle of operation by said driving means while said carriage is in said predetermined position, and means conditioned by said total-taking control means, when in total-taking condition, to disable said retaining means and return all of said disabling means to their normal conditions.

18. A machine of the class specified, having means for driving it through cycles of operation, printing mechanism, a plurality of settable control members, printing control means conditioned by a first one of said control members, when set, to control said printing mechanism to print a predetermined character, and means conditioned by a second one of said control members, when set for a machine cycle, to cause said printing-control means to be conditioned by said first one of said control members, when set for the following machine cycle, to control said printing mechanism to print a different predetermined character.

19. A machine of the class specified, having means for driving it through cycles of operation, printing mechanism operated from said driving means in machine cycles, a plurality of settable control members, an element actuated from said driving means in machine cycles, printing control means normally conditioned by a first one of said control members, when set, to control said printing mechanism to print a predetermined character, and means conditioned by a second one of said control members, when set for a machine cycle, and controlled by said element in said machine cycle to cause said printing control means to be conditioned by said first one of said control members, when set for the next machine cycle, to control said printing mechanism to print a different predetermined character.

20. A machine of the class specified, having means for driving it through cycles of operation, printing mechanism operated from said driving means in machine cycles, registering mechanism, a plurality of settable control members, an element actuated from said driving means in machine cycles, printing control means controlled by said registering mechanism in accordance with the conditions thereof and normally conditioned by a first one of said control members, when set, to control said printing mechanism to print one predetermined character, when said register is in one condition and a second predetermined character when said register is in another condition, and means conditioned by a second one of said control members, when set for a machine cycle, and controlled by said element in said machine cycle to cause said printing control means to be conditioned by said first one of said control members, when set for the next machine cycle, to control said printing mechanism to print a third predetermined character when said register is in said one condition and a fourth character when said register is in said other condition.

21. A machine of the class specified, having means for driving it through cycles of operation, printing mechanism operated from said driving means in machine cycles, registering mechanism, a plurality of settable control members, elements actuated from said driving means in machine cycles, printing control means controlled by said registering mechanism in accordance with the conditions thereof and normally conditioned by a first one of said control members, when set,

to control said printing mechanism to print one predetermined character when said register is in one condition and a second predetermined character when said register is in another condition, means conditioned by a second one of said control members, when set for a machine cycle, and controlled by one of said elements in said machine cycle to cause said printing control means to be conditioned by said first one of said control members, when set for the next machine cycle, to control said printing mechanism to print a third predetermined character when said register is in said one condition and a fourth character when said register is in said other condition, and means conditioned by said first one of said control members, when set, and controlled by one of said elements, to restore to normal condition said means conditioned by said second one of said control means.

22. A machine of the class specified, having registering mechanism, a plurality of settable control members, driving means controlled by each of said control members, when set, to cause said driving means to drive said machine through cycles of operation, an element actuated from said driving means in machine cycles, printing mechanism operated from said driving means in machine cycles, printing control means controlled by said registering mechanism in accordance with the conditions thereof and normally conditioned by a first one of said control members, when set, to control said printing mechanism to print one predetermined character when said register is in one condition and a second predetermined character when said register is in another condition, means conditioned by a second one of said control members, when set for a machine cycle, and controlled by said element in said machine cycle to disable all but said first one of said control members from causing said machine to be driven through a further cycle of operation by said driving means and to cause said printing control means to be conditioned by said first one of said control members, when set for the next machine cycle, to control said printing mechanism to print a third predetermined character when said register is in said one condition and a fourth character when said register is in said other condition.

23. A machine of the class specified, having a traveling carriage, a plurality of settable control members, driving means controlled by each of said control members to cause said driving means to drive said machine through cycles of operation, elements actuated from said driving means in machine cycles, printing mechanism operated from said driving means in machine cycles, printing control means normally conditioned by a first one of said control members, when set, to control said printing mechanism to print a predetermined character, means conditioned by a second one of said control members, when set for a machine cycle, and controlled by one of said elements in said machine cycle to disable all but said first one of said control members from causing said machine to be driven through a further cycle of operation by said driving means and to cause said printing control means to be conditioned by said first one of said control members, when set for the next machine cycle, to control said printing mechanism to print a different predetermined character, and means controlled by said carriage to disable said second one of said control members from causing said machine to be cycled except while said carriage is in a predetermined position.

24. A machine of the class specified, having a traveling carriage, a plurality of settable control members, driving means controlled by each of said control members to cause said driving means to drive said machine through cycles of operation, elements actuated from said driving means in machine cycles, printing mechanism operated from said driving means in machine cycles, printing control means normally conditioned by a first one of said control members, when set, to control said printing mechanism to print a predetermined character, means conditioned by a second one of said control members, when set for a machine cycle, and controlled by one of said elements in said machine cycle to disable all but said first one of said control members from causing said machine to be driven through a further cycle of operation by said driving means and to cause said printing control means to be conditioned by said first one of said control members, when set for the next machine cycle, to control said printing mechanism to print a different predetermined character, means controlled by said carriage to disable said second one of said control members from causing said machine to be cycled except while said carriage is in a predetermined position, and means conditioned by said first one of said control members, when set, and controlled by one of said elements to restore to normal said means conditioned by said second one of said control members.

25. A machine of the class specified, having a traveling carriage, registering mechanism, a plurality of settable control members, driving means controlled by each of said control members to cause said driving means to drive said machine through cycles of operation, elements actuated from said driving means in machine cycles, printing mechanism operated from said driving means in machine cycles, printing control means controlled by said registering mechanism in accordance with the conditions thereof and normally conditioned by a first one of said control members, when set, to control said printing mechanism

nism to print one predetermined character when said registering mechanism is in one condition and a second predetermined character when said registering mechanism is in another condition, means conditioned by a second one of said control members, when set for a machine cycle, and controlled by one of said elements in said machine cycle to disable all but said first one of said control members from causing said machine to be driven through a further cycle of operation by said driving means and to cause said printing control means to be conditioned by said first one of said control members, when set for the next machine cycle, to control said printing mechanism to print a third predetermined character when said registering mechanism is in said one condition and a fourth predetermined character when said registering mechanism is in said other condition, and means controlled by said carriage to disable said second one of said control members from causing said machine to be cycled except while said carriage is in a predetermined position.

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