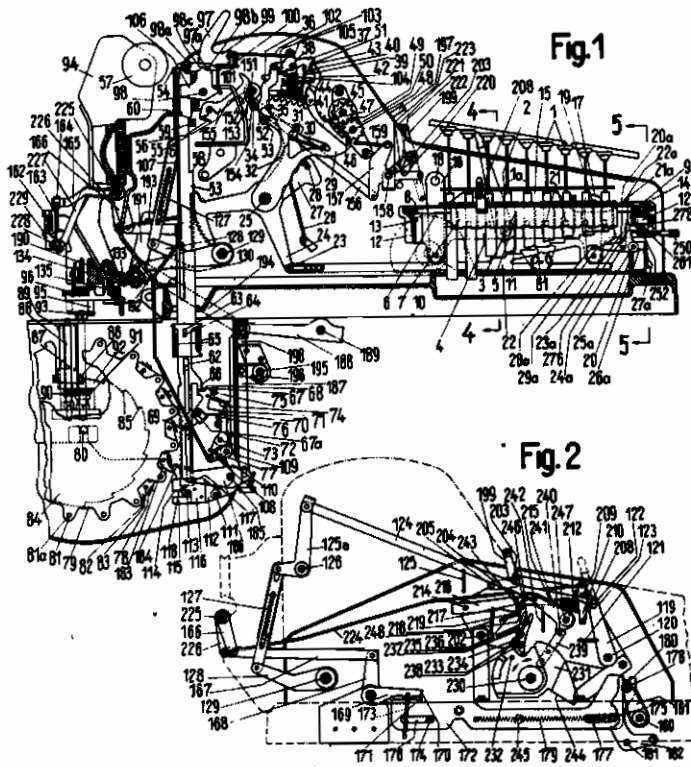


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W. HÖSZLER ET AL
CALCULATING OR BOOKKEEPING MACHINES
Filed Aug. 20, 1940

Serial No.
353,408
4 Sheets-Sheet 1



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Fig. 3

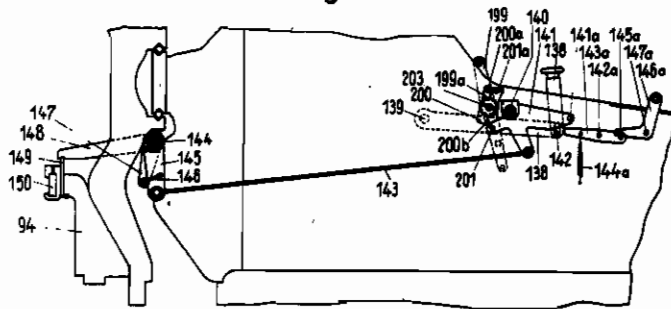
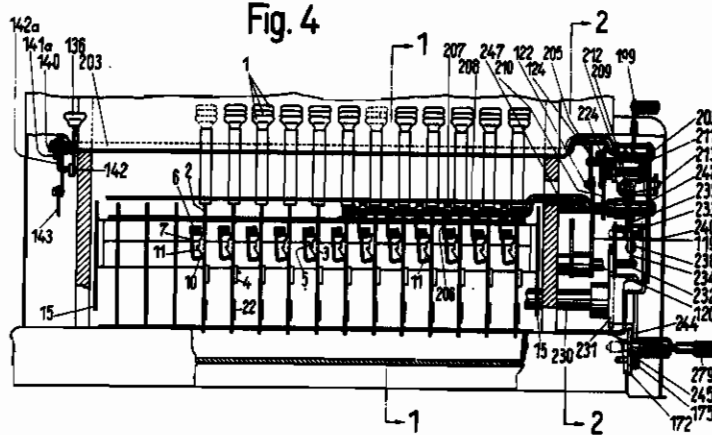


Fig. 4



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Fig. 5

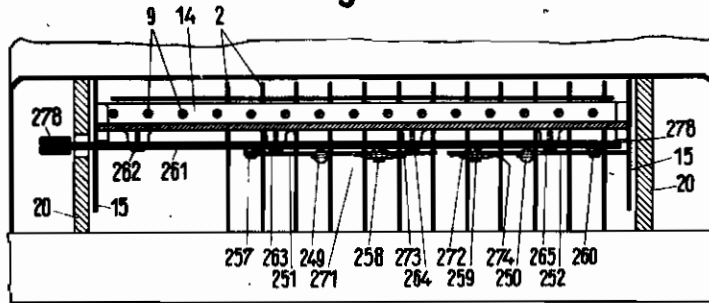


Fig. 6

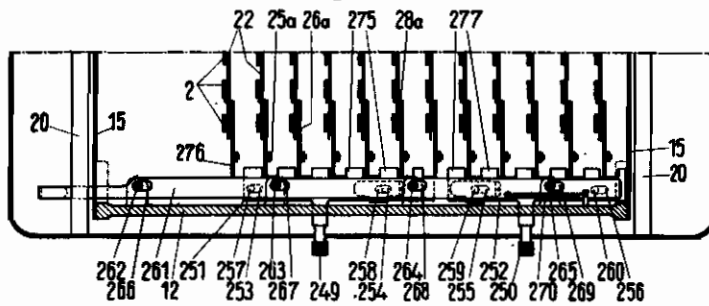
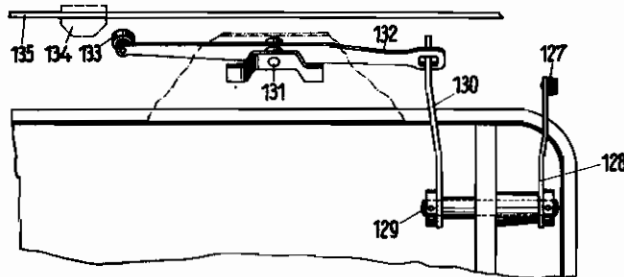


Fig. 7



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Fig.8

	1	2	3	4	5
	Date	Days	Hours	rate of wages	Amount
FRED MILLER	1938 Mar. 4	24	102,00	0,80	81,60
	Gross wages	Tax on wages	Additional tax I	Additional tax II	Sick fund
№ 10347	109,40	3,40	1,50	1,70	1,60

6	7	8	9	10	11
125 % Overtime Amount	150 % Overtime Amount	Additional Hours 125 % Amount			
3	3,00	2	2,40	4	4,00
Insurance I	Insurance II	Union tax I	Union tax II	Union tax III	Advance
1,50	1,50	1,20	1,50	1,30	10,00

12	13	14	15	16	17	18
Additional Hours 150 % Amount	Premium	Bonification	Holidayfund	Support	Gross wages	
2	2,40	3,00	2,00	10,00	1,00	109,40
Rent	Other deduction	Abatement	Carried forward earnings	Surplus earnings	Net wages	
5,00	4,00	1,00	,14	,34	74,00	

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ALIEN PROPERTY CUSTODIAN

CALCULATING OR BOOKKEEPING MACHINES

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Application filed August 20, 1940

The invention relates to a calculating or bookkeeping machine with full key-board with split-able printing mechanism and with an adding and subtracting totalizer and with several accumulators arranged on a common carrier, said accumulators being successively brought into the operative position in dependence on the movement of the paper carriage, various functions of which machine are automatically set up by control elements provided on the paper carriage.

The invention has for its object to construct such a machine in such a manner that it is possible to book in two lines the one typed under the other and to accumulate twice the number of accumulator totals as corresponds to the number of accumulators, this accumulation rendered possible by splitting of the printing mechanism, while at the same time it is possible to automatically perform different kinds of work in one line than in the other line by carriage control. Thus it is possible to employ a narrower form and therefore a shorter paper carriage. According to the invention this is attained in that the key-board of the machine is sub-divided into two sections and the keys of the one section act upon linkages controlled from the paper carriage in such a manner that the controls of the various functions effected from the paper carriage are rendered either effective or ineffective.

An embodiment of the invention is illustrated by way of example in the accompanying drawings in which

Fig. 1 shows a longitudinal section through a bookkeeping machine on section line 1—1 of Fig. 4,

Fig. 2 is a section on line 2—2 of Fig. 4,

Fig. 3 shows in side elevation details of the carriage control,

Fig. 4 is a cross-section through the bookkeeping machine on section line 4—4 of Fig. 1,

Fig. 5 is a cross-section through the bookkeeping machine on section line 5—5 of Fig. 1,

Fig. 6 shows in top plan view, partly in section the front portion of the bookkeeping machine,

Fig. 7 shows a detail of the subtraction control,

Fig. 8 shows a booking form for wages account filled with postings on the machine.

In Fig. 1 the digit keys, of which twelve rows are provided in this form of construction, are designated by 1. Each digit key 1 has at the lower end of its stem 1a a slide 2 which has two rectangularly bent-off portions 3 and 4. The left side of the bent-off portion 3 forms an inclined face 11, as shown in Fig. 4, and has a recess 5

in the middle. A locking bar 7 fixed on a square-shaft 6 cooperates with the bent-off portion 3, said locking bar being pivoted about the shaft 6 which is journaled at 8 and 9. The locking bar 7 has in its lower edge as many portions 10 bent off at right angles as there are digit keys in one row.

If a digit key is depressed the inclined face 11 presses upon the corresponding bent-off portion 10 and thereby rocks the locking bar 7. At the end of the descending movement of the digit key the bent-off portion 10 engages into the recess 5, so that the key is securely held in the depressed position. If a digit key 1 has been depressed erroneously, it can be released by depressing the correct key. When the correct key is depressed the locking bar is rocked so much, that the bent-off portion 10 is moved out of the recess 5 of the erroneously depressed digit key so that this key can jump upwards to its inoperative position under the action of a spring not shown, the correct digit key being securely held in its operative position by the locking bar 7.

In order to maintain the locking of the depressed digit keys 1 during a machine operation and to thus prevent depression of other keys or alteration of the values indicated by the depressed keys, the following arrangement is made:

The pivot points 8 and 9 of the shafts 6 which carry the locking bars 7 are provided in a rectangular frame 12 which encloses all slides 2 of the key-board and consists of the elements 13, 14 carrying the pivot points 8 and 9 and of the side plates 15. On each side plate 15 two levers 16, 17 are hinged, which are pivotally mounted in the machine frame 20 at the points 18 and 19, so that the frame 12 can be shifted from the position in Fig. 1 to the left and back to the right. A spring, which is not shown, pulls the frame 12 to the right against a stop also not shown; this is the position shown in Fig. 1. At the beginning of every operation of the machine the frame 12 is moved against the action of the spring not shown to the left, relative to Fig. 1, by such a distance that the bent-off portions 10 of the locking bars 7 come into the range of pins 21 fixed on the key-slides 2. The frame 12 remains in this position almost to the end of the machine operation, in order to be then returned to its ineffective position by the action of the spring. If the frame 12 is in its effective left hand position, it is not possible to depress a key, as the pins 21 are held by the bent-off portions 10 of the locking bars 7 and the digit keys are thus prevented to carry out a downward movement. By this arrangement

it is attained, that during a machine operation any actuation or releasing of the keys is impossible.

Stepped bars 22, which in known manner cooperate with the key-slides 2 and serve for feeling off the numeral values corresponding to the depressed keys 1 in that the steps 61 on the stepped bars 22, at their movement to the left relative to the position in Fig. 1, strike against the bent-off portions 4 of the depressed keys 1, are hingedly mounted at 23 on toothed segments 24 which are oscillatably mounted on an shaft 25. Springs 26 tend to rotate the toothed segments 24 in clockwise direction. This movement is possible only if an abutment rod 28, fixed on two levers 27 which are rigidly fixed on the shaft 25 at the sides of all toothed segments 24 and are turned at the beginning of every operation of the machine in clockwise direction and at the end of every operation of the machine in anticlockwise direction, liberates the toothed segments 24 when the levers 27 swing in clockwise direction.

Each square-shaft 6 has at the right hand end in Fig. 1 a plate 20a extending perpendicularly to the locking bars 7 fixed on the shafts 6, said plate having a hole 21a in its end remote from the shaft 6. The shouldered end 22a of the rod 23a engages into this hole 21a. The rod 23a is hinged at 24a to a three-armed lever 25a pivotable about a pin 25a, said lever being held by a spring 27a in the position shown in Fig. 1. A bent-off portion 26a of the three-armed lever 26a allows movement of the stepped bar 7 only until the projection 29a strikes against it. If a digit key 1 is depressed, the corresponding locking bar 7 is rocked as mentioned above. At this rocking movement the plate 20a presses against the shoulder of the rod 23a whereby the three-armed lever 26a is turned in anti-clockwise direction. After the corresponding bent-off portion 10 of the locking bar 7 has engaged into the recess 5 of the depressed key 1, the three-armed lever 26a is held in a position in which its bent-off portion 28a is no longer in the path of the projection 29a of the stepped bar 22. As soon as a digit key 1 is depressed, the corresponding stepped bar 22 is released so that during the operation of the machine feeling off of the numeral value corresponding to the depressed key 1 is possible.

Toothed sectors 29 are pivotally mounted on the shaft 25 each sector being connected by a spring 30 with the corresponding toothed segment 24. The spring 30 has the tendency to bring into contact with a pin 32 fixed on the toothed segment 24 the right hand edge of a recess 31, relative to Fig. 1, in the toothed sector 29. The toothed segments 24 are held in their inoperative position on the one hand by a fixed rod 33 extending over all toothed segments 24 and on the other hand by the abutment rod 28. The spring 30 therefore tends to rotate the toothed sector 29 in anticlockwise direction. This rotation is prevented by a locking element 36, which at its downward movement engages with its lower end between a stationary stop 34 and a pin 35 fixed on the toothed sector 29. This locking element is hinged on a two-armed lever 37 which is pivotally mounted in the machine frame at 38. A spring 39 tends to turn this lever 37 in clockwise direction. This turning movement is prevented thereby that a bent-off portion 40 of a ten's carry pawl 42 pivotable about a pin 41 engages in front of a shoulder 43

of the lever 37. The ten's carry pawl 42 is secured in this position by a spring 44.

The ten's carry pawls 42 have at their lower end each two projections 45 and 46 cooperating with the ten's carrying cams 47 and 48 of the corresponding toothed wheels 49 and 50 of the adding and subtracting totalizer. If a set of wheels of this totalizer is in mesh with the toothed sectors 29 and if a ten's carrying cam 47 or 48 encounters a projection 45 or 46 at entering an amount into the totalizer, the ten's carry pawl 42 is rocked in clockwise direction about the fulcrum 41 against the action of the spring 44. The bent-off portion 40 of the ten's carry pawl 42 is thereby disengaged from the shoulder 43 of the lever 37. The lever 37 can then carry out, under the action of the spring 39, a movement in clockwise direction, the bent-off portion 40 of the ten's carry pawl 42 coming into engagement with the shoulder 51 of the lever 37. At the same time when the lever 37 is moved in clockwise direction, the locking piece 36 is lifted and the toothed sector 29 is thus liberated for a further turning movement in anticlockwise direction under the action of the spring 30. When the toothed sector 29 is moved in anticlockwise direction until the pin 35 strikes against the projection 52 of the locking piece 36, a unit is transmitted at the same time into the next higher ordinal place of the adding and subtracting totalizer 49, 50.

Type carriers 53 mesh with the toothed segments 24 and have types 54 at their upper end. During the operation of the machine, the type carriers 53 are lifted by the toothed segments 24 such a distance and such types 54 are brought into printing position, as correspond to the values of the depressed digit keys. This upward movement is limited by the stepped bars 22 hingedly mounted at 23 on the toothed segments 24, the steps 61 of these bars striking against the bent-off portions 4 of the key-slides 2. As soon as the type carriers 53 have arrived at the printing position, hammers 55 are released and flung under the action of springs 56 against the types 54, so that on the paper sheet guided over the platen 57 the amount according to the depressed keys is printed. When a type carrier 53 is raised in accordance with the numeral "9" its projection 58 comes to rest against the abutment 59.

Each type carrier 53 is connected at its lower end with a rack 62 by a pin and slot connection 63, 64. Springs 65 tend to bring the pin 64 to rest against the upper end of slot 63 and to move the rack 62 in downward direction by a unit. The rack 62 is prevented from participating in this movement as a bent-off portion 68 of the ten's carry pawl 67 is in the path of a projection 66 of the rack. This locking position is shown in Fig. 1. If the ten's carry pawl 67 is rocked in anti-clockwise direction about its fulcrum 67a, the bent-off portion 68 of rack 62 liberates the rack 62 to carry out a carrying movement in downward direction corresponding to a unit. When the rack 62 moves downwards by one tooth, the value 1 is added into the accumulator 78 in the corresponding ordinal place. The ten's carry pawl 67 has on its lower arm a projection 69, on which the ten's carrying cam of the corresponding toothed wheel of the accumulator 78, which is in engagement, can act so that the ten's carry pawl 67 is rocked in the above described manner in anti-clockwise direction. In this rocked position the ten's carry pawl 67 is held on the bent-off portion 71 by the shoulder

70 of a lever 72 turnable about the bolt 73. The upper arm of the ten's carry pawl 67, in the position in which it locks the rack 62, is forced by a spring 74 against a rod 75 and the bent-off portion 71 then engages with the shoulder 76 of the lever 72. The lever 72 is pressed against the bent-off portion 71 of the ten's carry pawl 67 by the action of a spring 77.

The accumulators 78, of which sixteen are provided in the bookkeeping machine described, are arranged in a drum rotatable about a shaft 80. The accumulator drum consists of two plates 79 arranged at a distance corresponding to the width of the accumulators 78 and having flap-like extensions 81. Each one of these extensions 81 has a bore 81a, and in these bores accumulator frames 82 are turnably mounted, so that the accumulators 78 mounted at 83 in the frames 82 can be brought into engagement with the racks 82 by means not shown.

Each of the sixteen accumulators 78 arranged in the accumulator drum can be brought separately into operative position by controlling the rotary movement of the drum from the paper carriage; therefore the device hereinafter described is provided:

A disc 84 arranged on the accumulator drum has steps 85 which are spirally arranged and cooperate with a stop 86. This stop 86 is fixed on a slidable piece 87 which, by means of a spindle 88, can be shifted in vertical direction in a guide 89. The spindle 88 is driven from a shaft 92 by means of toothed wheels 90, 91. A pinion 93 having five teeth is rigidly fixed on the upper end of shaft 92 and can be turned by one tooth by each control member 95 when the paper carriage 94 moves. The control members 95 are arranged on a bar 96 removably fixed on the paper carriage 94. If the paper carriage 94 jumps from one column-position to the other column-position, the pinion 93 is turned by means of a control member 95 by one tooth and the sliding piece 87 with the stop 86 is lifted so high that the next following step 85 comes to rest against the stop 86. If the accumulator drum is in this position, the corresponding accumulator 78 is brought into mesh with the racks 62 in the following operation of the machine.

In the machine described the key-board is subdivided into two equal sections and the printing mechanism of the machine is split accordingly. In a similar manner the adding and subtracting totalizer and the sixteen accumulators are subdivided each one into two sections, so that thirty-two totals can be accumulated in the machine. In the calculating mechanisms at the places corresponding to the line of subdivision between the two sections of the key-board, ten's carrying can be prevented.

The following arrangement is made for preventing ten's carrying:

A hand operated lever 97 is pivotably mounted at 98 in the machine frame and has a horizontal arm 99. This horizontal arm 99 acts, when the hand lever 97 is turned in clockwise direction to the position shown in Fig. 1 upon the arm of a two-armed lever 100 pivotable about a bolt 101, said arm extending forward from the plane of the drawing, so that the rear arm of lever 100 pulls to the left relative to Fig. 1 a rod 102 hingedly connected with this rear arm. The right hand end of rod 102 is hingedly connected with a lever 103, which lever with its left lower end 105, constructed as abutment, acts upon a bent-off portion 104 of the lever 37. If, therefore, the

hand lever 97 is turned in clockwise direction, the lower end 105 of the lever 103 presses on the bent-off portion 104 of the lever 37 and brings this lever 37 into the position shown in Fig. 1. The lower end of the locking piece 36 hingedly mounted on the lever 37 is thus brought in between the stationary abutment rod 34 and the pin 35 fixed on the toothed sector 29, so that this toothed sector is prevented from moving in anti-clockwise direction under the action of the spring 30. In this manner a ten's carrying at the places corresponding to the line of subdivision between the two key-board sections is prevented.

A rod 107 is hingedly mounted on the lower arm 106 of the hand lever 97 and the lower end of this rod 107 is turnably fixed on a lever 108 rigidly mounted on a bolt 108. The lever 110, also fixed on bolt 109, is hingedly connected by means of a bolt 111 with a slide 112. A slot 114 in mesh with bolt 113 serves for guiding the slide 112. The slide 112 consists of two plates 115 and of an intermediate plate 116, which has a rectangular recess 117 and an oblique face 118. If the hand lever 97 is brought to the position shown in Fig. 1, the rod 107 fixed on the lower arm 106 of the hand lever 97 swings the lever 108 and with the same also the lever 110 in clockwise direction, so that the slide 112 is shifted to the left relative to Fig. 1. The recess 117 of the plate 116 comes then underneath the lower end of the rack 62 guided between the two plates 115. The rack 62 is in this manner securely held in its position shown in Fig. 1 a ten's carrying being prevented.

By turning the hand lever 97 to the position shown in Fig. 1 a ten's carrying is prevented in the described manner as well in the adding and subtracting totalizer as in the accumulator which is in operative position.

For controlling the method of calculation of the totalizer, i. e. addition or subtraction, a lever 119 pivoting about a point 120 is provided, which is pulled by a spring 121 to its position shown in Fig. 2, this position corresponding to the addition position of the adding and subtracting totalizer. If the lever 119 is shifted in clockwise direction, the adding and subtracting totalizer is set for "subtraction". The lever 119 can be automatically shifted by paper carriage control. The following arrangement is provided therefore: A recess 123 in a link 124 engages a pin 122 fixed on the lever 119 and is held in this position by the action of a spring 125. The link 124 is hingedly fixed on a bellcrank 125a which pivots about a stationary bolt 126 and is connected by a resilient link 127 with a lever 128 rigidly connected with a stationary bolt 129. A one-armed lever 130 is rigidly fixed on the bolt 129 and its end projects into a recess in a two-armed lever 132 pivotable about a stationary bolt 131 as shown in Fig. 7. The other end of the two-armed lever 132 carries a roller 133 on which control members 134 can act which are mounted on a bar 135. The bar 135 is fixed on the shiftable paper carriage 94. If at the movement of the paper carriage 94 a control member 134 passes along the roller 133, the two-armed lever is rocked in anti-clockwise direction as shown in Fig. 7, so that the rod 124 is shifted through the elements 130, 128, 129, 127, 126, 125 towards the right relative to Fig. 1 and the subtraction lever 119 is brought to its position corresponding to the subtraction position of the adding and subtracting totalizer.

For setting the machine for non-addition (NA) of the totalizer a key 136 is provided, which is

connected with a lever 138 pivotable about a pin 138. This key 138 may also be actuated from the paper carriage and herefor the following arrangement is made as shown in Fig. 3:

A three-armed lever 141, pivotably mounted on a stationary pin 140, rests against a pin 142 projecting from the stem of the key 136. The lower arm of the three-armed lever 141 is connected with a rod 143 which is hingedly connected to a lever 145 loosely mounted on a shaft 144. A bellcrank 147, 148 is further pivotably mounted on the shaft 144 and rocked in clockwise direction when a control member 149 on a bar 150 fixed on the paper carriage 84 strikes against it, said bellcrank carrying along the lever 145, by means of a spring 146 connecting the arm 147 and the lever 145, and brings by means of rod 143 and the three-armed lever 141 the NA key into its active position.

The printing mechanism of the machine may be blocked in that the edges 152 and 153 of a shaft 151 are brought into the path of the extensions 154 of the printing hammers 55. Shaft 151 is cut out in the range of those type carriers which are used for date printing, only for one half, whereas in the range of the type carriers which effect the printing of the numerals it is cut out up to the edge 153. In the position of the cut out shaft 151 shown in Fig. 1 the printing hammers which effect the date printing are prevented by the edge 152 from moving in anti-clockwise direction, whereas those printing hammers, which effect the printing of the numerals, are liberated, as the edge 153 is not in the path of the extensions 154 of these printing hammers 55. The shaft 151 is connected with a link 156 by means of a crank 153 rigidly fixed on the shaft, this link 156 being hingedly connected with a three-armed lever 157 pivotably mounted at 158. A spring 159 tends to turn the three-armed lever 157 in anti-clockwise direction in order to thereby liberate the printing hammers for the date printing.

In order to automatically take the total from the totalizer 49, 50 a crank 161 is connected with the shaft 180 which is in connection with the total-lever of the totalizer, said crank adapted to be actuated from the paper carriage. Herefor a control member 163 is mounted on a bar 162, fixed on the paper carriage 94, said control member being adapted to act upon a roller 164 of a bellcrank 165, 166. The arm 168 of this lever is connected, by means of a link 167, with a bellcrank 168, 169. The horizontal arm 169 of this bellcrank has a bent-off portion 170 which engages behind a projection 171 of a slide 172 shiftably guided on pins 174, 175 by means of slots 176, 177. A spring 173 holds the bellcrank 168, 169 in the position shown in Fig. 2. The right hand upper end of slide 172 cooperates with a pin 178 mounted on the crank 161. A spring 179 tends to shift the slide 172 towards the right relative to Fig. 2, but is prevented from doing this by the bent-off portion 170 of the bellcrank 168, 169. The fork-shaped end 180 of a bellcrank 182 pivotably mounted at 181 is in mesh with the pin 178 of crank 161; the right hand end of the bellcrank 182 is connected with a link not shown which at the rocking of the bellcrank 182 in clockwise direction initiates a machine operation. If therefore the roller 164 of the bellcrank 165, 166 is rocked by a control member 163, the bellcrank 168, 169 is then rocked by means of link 167 in anti-clockwise direction, so that the bent-off portion 170 releases the slide 172. This slide 172

turns under the action of spring 176, when it moves to the right, the crank 181 and the bellcrank 182 in clockwise direction whereby the machine is set to total taking and at the same time a machine operation is initiated. In this manner a total taking from the totalizer 49, 50 is effected automatically.

The idle stroke being necessary before the automatic total taking operation is initiated automatically by a cam 183 provided on the accumulator drum 79 in the following manner: During the movement of the accumulator drum 78 the cam 183 moves along a bent-off portion 184 of a lever 186 pivotably mounted at 185, rocking the lever 186 in clockwise direction, whereby, by means of a link 187 fixed on the lever 186 and of a link 190, a lever 188 pivotable about 189 is rocked in anti-clockwise direction, and thereby a machine operation is initiated.

The initiating of a machine operation can be effected also from the paper carriage, and with this object in view control members 190 are provided on the paper carriage which can cooperate with a roller 192 fixed on a lever 191. The lever 191 pivotable about 193 is connected by means of a link 194 with the lever 188 so that, when a control member 180 runs against the roller 192, the lever 188 is rocked in anti-clockwise direction and an operation of the machine is initiated thereby.

A machine operation can also be initiated by a crank 196 turnably mounted at 195 and connected with the lever 188 by means of a link 198. The crank 196 is connected with the total-key 197 of the accumulators so that, when this key 197 is depressed, the crank 196 is moved in clockwise direction and thus a machine operation is initiated.

The control of certain functions from the paper carriage can be rendered ineffective by lockings which at the operation of the keys of the right section of the key-board can be unlocked again. The following devices are provided herefor:

A hand lever 199 and a crank 199a are fixed on a shaft 203 as shown in Fig. 3. A pawl 200 pivotably mounted on the shaft 203 and connected with the crank 199a is pressed, by a spring 201a, against a pin 200a of the crank 199a. In the normal position of the hand lever 199 shown in Fig. 3 the lower end of pawl 200 rests against a pin 201 of triangular shape fixed on the three-armed lever 141, so that movement of this three-armed lever 141 in clockwise direction is prevented. If a control member 149 strikes against the bellcrank 147, 148, the bellcrank 147, 148 is rocked in clockwise direction but cannot draw along the lever 145 as the three-armed lever 141 is locked. In this manner actuation of the NA-key from the paper carriage is rendered impossible. If the hand lever 199 is pulled by the action of a spring 202 in clockwise direction about its pivot 203, as shown in Fig. 2, its pawl 200 moves away from pin 201 as shown in Fig. 3 so that, when the bellcrank 147, 148 is actuated by a control member 149, the NA-key 138 is depressed.

On the shaft 203 of hand lever 199 a crank 204 is rigidly fixed, the pin 205 of this crank lifts, when the hand lever 199 is pulled in clockwise direction, the link 124 and brings the recess 123 of this link out of engagement with the pin 122. In this manner the automatic control of the subtraction lever 119 effected from the paper carriage is eliminated.

When a key of the right hand section of the key-board which has for instance six rows of digit keys is depressed, the inclined face 11 presses

on the bent-off portion 10 of the corresponding locking bar 7 and this locking bar is rocked in clockwise direction. By this rocking movement a rod 208 having abutment rings 207 is shifted to the right by a plate 206 fixed on the locking bar 7. The plates 206 are provided only on those locking bars which belong to the right section of the key-board. The right hand end of the rod 208 acts upon a lever 210. The shaft 209 of lever 210 is carried in a frame 211, which is pivotable about a shaft 212. If the frame 211 is rocked in anti-clockwise direction by the rod 208 and the lever 210, a lever 213 rigidly fixed on frame 211 engages under the right hand end of a lever 215 pivotable about a pin 214 and rotates this lever in anti-clockwise direction, so that a shoulder 217 on the arm 216 of the lever 215, which is the front arm relative to Fig. 2 and controlled by a spring 248, moves away from a square-pin 218 arranged on the hand lever 199, so that this hand lever 199 is moved by the action of spring 202 in anti-clockwise direction and comes in engagement with a second shoulder 219 of the arm 216. By this movement of the hand lever 199 on the one hand the right hand end of link 124 is brought by the crank 204 out of engagement with the pin 122 of the subtraction lever 119 and on the other hand the non-adding set up by paper carriage control is released. At the same time the liberating of the date printing takes place, in that at the movement of the hand lever 199 in clockwise direction a crank 220 rigidly connected with the hand lever 199 is moved and thereby a spring 221 is detented which connects the crank 220 and a lever 222, the pin 223 of which cooperates with the three-armed lever 157, so that this three-armed lever is liberated for a movement in anti-clockwise direction under the action of the spring 159.

If the effects obtained by depressing of keys of the right hand key-board section have to be cancelled, the depressed keys must first be released, the hand lever 199 brought to its position shown in Figs. 2 and 3 and the subtraction lever shifted to the right relative to Fig. 2, in order that in case in the corresponding column position a subtraction control member had rocked the link 124 towards the right relative to Fig. 2, the notch 123 of this link 124 is brought in engagement with the pin 122 of the subtraction lever 119, finally the three-armed lever which, at the running on of the bellcrank 147, 148, has been turned in clockwise direction must be returned to its initial position shown in Fig. 3. Before the three-armed lever 141 is brought to its initial position, its triangular pin 201 is within the recess 200b of the pawl 200, so that when the three-armed lever 141 is turned in anti-clockwise direction, the triangular pin pushes away the pawl 200 rotating the same in clockwise direction by a small angular amount against the action of spring 201a. After this rotating movement the pawl 200 and the three-armed lever 141 are in the position shown in Fig. 3. To this position the three-armed lever 141 is brought by the action of hand lever 146a, rotatable about 147a. The left lower arm of the hand lever 146a acts upon a pin 145a arranged on a lever 143. A spring 144a tends to turn in anti-clockwise direction the lever 143a pivotable about 142a. If the lever 148 is turned in anti-clockwise direction, the left end of the lever 144 engages under the pin 141a of the three-armed lever 141 and swings this lever in anti-clockwise direction to its initial position shown in Fig. 3.

The action upon the lever 210 effected by keys of the right hand key-board section can be rendered ineffective by a rod actuated by paper carriage control, so that it is possible, to depress the keys of the right hand section of the key-board without obtaining thereby the above described effects. With this object in view the lever 210 is connected with a rod 224, which is hinged on a bellcrank 226, 227 pivotably mounted at 225. The roller 228 arranged on the left arm 227 can cooperate with control members 229 fixed on the bar 162 so that, when a control member 229 runs against the roller 228, the bellcrank is rocked in anti-clockwise direction and thereby the lever 210 turned in clockwise direction and its lower arm swung out of the range of rod 208.

The returning of the hand lever 199 to its initial position shown in Fig. 2 is effected at the end of a machine operation by a disc 231 mounted on the main shaft 230 of the machine. At the forward stroke of each machine operation the disc 231 is turned in clockwise direction and at the rearward stroke of each machine operation it is turned in anti-clockwise direction. Let us suppose the square-pin 218 of the hand lever 199 be in engagement with the shoulder 219 of the arm 216. If then at the forward stroke of the machine operation disc 231 is turned in clockwise direction, the pin 232 moves without effect along the pass-by pawl 234 which pivots on a lever 235 fixed at 233, the upper fork-shaped end of this lever being in mesh with a pin 236 on the lower end of the hand lever 199, the pawl 234 being pivotable on the pin 238 only in anti-clockwise direction against the action of the spring 237. At the same time a pin 240 mounted on an arm 239 fixed on the disc 231 liberates a pawl 241 pivotable about 247, so that the nose 243 of this pawl, under the action of a spring 242, comes to rest against the upper edge of the square-pin 218. If slide 172 has been shifted to the right under the action of the spring 179 in one of the preceding machine operations, this slide 172 is brought, by the extension 244 of disc 231 cooperating with the pin 245 of slide 172 towards the left to its position shown in Fig. 2. At the rearward stroke of the main shaft 230 of the machine the pawl 234 with lever 235 is rocked in clockwise direction by the pin 232 fixed on the disc 231 to such a distance that the recess 248 of pawl 241 comes into engagement with the square-pin 218 of hand lever 199. In this position the square-pin 218 does not yet bear against the shoulder 217 of the arm 216. The square-pin 218 bears against shoulder 217 only if at the end of the rearward stroke the pin 240 lifts the pawl 241 in clockwise direction and thereby liberates the hand lever 199 for a small movement in clockwise direction. The pawl 241 is necessary in order to hold the hand lever 199 in its shifted position after the instantaneous shifting of the hand lever 199 in anti-clockwise direction, as it may happen that the shoulder 217 of arm 216 does not come instantaneously into engagement with pin 218, so that if pawl 241 were not provided the hand lever 199 would be returned again in clockwise direction under the action of the spring 262 and the square-pin 218 would come into engagement with shoulder 219.

In order that from the two accumulator- and totalizer-sections the totals can be taken separately a device manually controlled is provided which locks during a total taking operation selectively either the one or the other differential mechanism corresponding to a key-board section.

For engaging the locking device, two handles 249 and 250 are provided, which are fixed on locking slides 251 and 252 respectively as shown in Figs 1 and 6. The locking slide 251, which is the left relative to Fig. 6, is guided on pins 257 and 250 by means of slots 253, 254 and the right hand slide 252 is guided on pins 259, 260 by means of slots 255 and 256. The pins 257, 258, 259 and 260 are fixed on a bar 261 which is guided on pins 262, 263, 264 and 265 arranged on the locking frame 12 by means of slots 266, 267, 268 and 269, said bar being shifted at the setting of the total-lever of the totalizer or of the total-key of the accumulators for total taking, towards the left relative to Fig. 6, held in this position during the machine operation, and jumping back into the initial position shown in Fig. 6 under the action of a spring 270 at the end of the machine operation. The locking slides 251, 252 are securely held in their position adjusted by hand relative to the bar 261 by springs 271 and 272 cooperating with projections 273 and 274. The extensions 275 of the locking slides 251 and 252 cooperate during a total taking operation with the vertical arms 276 of the zero pawls 26a in the following manner:

If the left hand locking slide 251 is shifted to the left relative to Fig. 6 by means of the hand lever 249, the right hand slide 252 being, however, left in the position shown in Fig. 6, a shifting to the left of both locking slides 251, 252 will be effected by bar 261 if the machine is set for total taking, the extensions 275 of the left slide 251 coming into the range of the zero levers 26a, the extensions 277 of the right locking slide 252 remaining, however, out of the range of the zero levers 26a. After the bar 261 has been shifted to the left relative to Fig. 6, at the beginning of the machine operation the locking frame 12 is moved to the left relative to Fig. 1 to its locking position. At this movement the extension 275 of the locking slide 251 which are in the range of the zero levers 26a strike against the vertical arms 276 of the zero levers 26a and swing these in anti-clockwise direction, so that their bent-off portions 26a liberate the step bars 22. In this position the zero levers 26a are held until, at the end of the machine operation, the locking frame 12 jumps back again to its ineffective position; whereas during this machine operation the left section of the differential mechanism is liberated, the right section of the differential mechanism is locked by the zero levers 26a remaining in the locking position shown in Fig. 1. In this instance only the totals can be taken from the left sections of the accumulators and of the totalizer.

If the totals have to be taken from the right hand sections of the accumulators or of the totalizer, the handle 250 must be shifted to the left relative to Fig. 6, in order that its extensions 277 at the shifting of the bar 261 towards the left by means of the total-lever of the totalizer or by means of the total-key of the accumulators come into the range of the zero levers 26a and the zero levers 26a of the right hand section of the key-board are swung to their ineffective positions when the locking frame 12 is shifted to its locking position.

For such cases in which the machine is not splitted in two sections and therefore totals are to be taken over the full capacity of the totalizer or of the accumulators, a locking slide 278 extending over the whole key-board is provided, said locking slide, when the total-lever of the totalizer or the total-key of the accumulators is

actuated, being shifted to the left relative to Fig. 1 so that its extensions corresponding in number to the number of digit key rows are brought into the range of the vertical arms 276 of the zero levers 26a. During the machine operation all three-armed levers 26a are swung in anti-clockwise direction and thereby all stepped bars 22 and toothed sectors 29 or racks 62 respectively are liberated for feeling off all toothed wheels of the totalizer or of the accumulator 76 being in mesh. In this manner the total can be taken from the full totalizer or accumulator.

The manner of operating the machine will now be explained on hand of a booking form for wages account on which various postings are printed by the machine as shown in Fig. 8.

Be it supposed that lever 97 is in the position shown in Fig. 1, in which the ten's carrying is interrupted between the two sections of the key-board, further the printing mechanism is split accordingly, the lever 199 brought into the position shown in Fig. 2, the hand lever 146a shifted in anti-clockwise direction for re-engaging the three-armed lever 141 and the subtracting lever 110 is turned in clockwise direction in order to couple the link 124 with the subtracting lever, in case the notch 123 of this link 124 be out of engagement with the pin 122 of the subtracting lever 110 and to thereby enable the control of the subtracting lever 110 from the paper carriage.

The amounts according to the keys depressed in the right hand section of the key-board are printed in the upper line, those according to the keys depressed in the left hand section of the key-board are printed in the lower line. As by actuation of keys of the right hand section of the key-board the automatic controlling of the kind of calculating of the totalizer set up by the paper carriage is made ineffective, the positive amounts are printed in the upper line, that is in this instance the items which together form the gross wages. In the lower line positive and negative amounts are printed, as at the action of the left hand section of the key-board the control of the kind of calculating of the totalizer is effected from the paper carriage. The amounts set by the keys depressed in the right hand section of the key-board, which are printed in columns 3 to 18, are entered at the same time into the right hand section of the totalizer as well as into the right hand section of one of the accumulators. The amounts of the keys depressed in the left hand section of the key-board are entered into the left hand section of the totalizer and at the same time into the left hand section of one of the accumulators. The individual columns of the booking form are arranged so that the printing mechanism, that is the mechanism for printing numbers and the date printing mechanism, extends over three columns. As in the upper line only those amounts are printed which have been set on the right hand section of the key-board, only the right hand section of the printing mechanism and the date printing mechanism are operative during the posting in the upper line, the date printing mechanism, however, only in such a column position in which a corresponding control member is provided.

If in the first column position the keys for the number of days are depressed in the right hand section of the key-board, the control of the kind of calculation of the totalizer from the paper carriage is made ineffective, the totalizer consequently remains in addition position and the control of the non-addition of the totalizer and

of the date printing from the paper carriage are effective. As in this column position not only a control member for non-addition of the totalizer but also a control member for non-addition of the accumulators is set, the number of the days is entered neither into the totalizer nor into the accumulator, but only printed in the column 2. The paper carriage then jumps automatically to the second column position in which the number of hours is entered into the right hand section of the first accumulator provided herefor and printed in the column 3, the date being printed at the same time in column 1. The number of the hours is not entered into the totalizer, as in this column position a NA-control member for the totalizer is provided. After the paper carriage has jumped to the next column position, the keys for the rate of wages are depressed and this item is printed during a next following machine operation by the right hand section of the printing mechanism and at the same time entered into the right hand section of the second accumulator. As in this column position also a NA-control member for the totalizer is set, also the rate of wages is not entered into the totalizer. The amount (column 5) set up by depression of keys in the next following column position is calculated into the right hand section of the totalizer and at the same time into the right hand section of the third accumulator. The amounts to be printed in the columns 6, 8, 10 and 12 are entered, owing to corresponding NA-control members, only into the right hand section of each corresponding accumulator, whereas the amounts to be printed in the columns 7, 9, 11, 13, 14, 15, 16, and 17 are calculated at the same time into the right hand section of the totalizer and into the right hand section of the corresponding accumulator. After the amount "1.00" has been printed in the position of the paper carriage corresponding to the column 17, the paper carriage jumps to an intermediate position in front of the last column position in which the accumulator drum is rotated by one step and thereby the sixteenth accumulator is brought in operative position. At this drum rotation the cam 183 arranged on the frame 82 of the sixteenth accumulator 78 initiates in the manner above described the idle stroke necessary before each total taking. After termination of this machine operation the paper carriage jumps to its last column position, the slide 172 being liberated by means of a control member 163 for setting the machine for total taking and initiating a machine operation, so that in this column position a total taking is automatically effected from the totalizer. At the same time the total taken from the totalizer is entered into the right hand section of the sixteenth accumulator.

Directly following on the total taking machine operation the paper carriage is automatically returned to the first column position, the platen being at the same time spaced up on line. In this initial position of the paper carriage the total taken from the right hand section of the totalizer must be set up on the left hand section of the key-board and during the next machine operation it is entered into the left hand section of the totalizer and at the same time printed in the column 1 of the lower line by means of the left section of the printing mechanism. As the left hand section of the key-board does not influence the control of the kind of calculation of the totalizer effected by the paper carriage, the kind of calculation is determined from the paper

carriage at the booking in the lower line in each column position. In the form of construction shown by way of example a subtraction control member is provided extending over the columns 2 to 15, so that in these columns 2 to 15 the totalizer is set from the paper carriage for subtraction. The keys of the left hand section of the key-board are without influence upon the arrangements for locking the date printing and the non-addition of the totalizer, so that when the left hand section of the key-board is used date printing and non-addition remain inefficient, even though on the paper carriage corresponding control members are provided for the booking in the upper line. The amounts posted in the lower line in the columns 2 to 15 are entered into the left hand section of a corresponding accumulator as well as subtractively into the left hand section of the totalizer. In the sixteenth column the computed amount is additively entered into the left hand section of the totalizer and at the same time into the left hand section of the corresponding accumulator. The paper carriage then jumps to the already mentioned intermediate position, in which the accumulator drum is rotated by one step and the sixteenth accumulator is brought in operative position. By this rotation of the accumulator drum an idle stroke of the machine is initiated again by means of the cam 183. The paper carriage then jumps to its last column position, in which a total taking operation is initiated automatically in the above described manner. At this machine operation the total is taken from the left hand section of the totalizer and this amount entered into the left hand section of the sixteenth accumulator.

In order to take the thirty-two totals accumulated in the accumulators, the locking slides 275, 277 have to be adjusted by means of the levers 248, 250 in such a manner, that the one section of the differential mechanism is locked and the other section is liberated. If the totals have to be taken from the right hand sections of the accumulators, the right hand locking slide 252 has to be moved to the left and the left hand locking slide has to be moved to the right relative to Fig. 6, in order that the extensions 277 of the right hand slide 252 come within the range of the zero levers of the right hand section of the key-board during the shifting of bar 261 to the left relative to Fig. 6 at the actuation of the accumulator total key 197, so that then the corresponding stepped bars 22 and the toothed sectors 29 or the racks 62 are liberated for feeling off the respective sections of the accumulators. After the totals have been taken from the right hand sections of the sixteen accumulators and printed successively in one line, the paper carriage is returned automatically to the first column position, line spacing of the platen taking place at the same time. The right hand slide 252 is then moved to the right and the left hand slide 251 to the left relative to Fig. 6, so that at actuation of the total-key 197 which may also initiate a machine operation the totals are taken from the left hand sections of the accumulators and successively printed in a second line.

Although at the actuation of a key of the right hand section of the key-board the control rods to be controlled or adapted to be adjusted from the paper carriage are uncoupled from the lever 119 for adjusting the kind of calculation of the totalizer, the lever 119 automatically moving into its additive position, an amount to be printed in a column of the upper line can be introduced also

subtractively into the right hand section of the totalizer. Let it be assumed, that in the column 15 of the upper line, instead of a credit amount, an amount has to be printed which represents any deduction and has to be entered subtractively into the totalizer. If a key of the right hand section of the key-board is depressed in this column position, the control of the kind of calculation of the totalizer from the paper carriage is rendered ineffective and the totalizer is set for addition, whereas the amount set by depression of keys has to be entered subtractively into the totalizer corresponding to the debit. For this reason a control member 229 must be provided in this column position to prevent the right hand section of the key-board from acting upon the control of the kind of calculation of the totalizer. If such a control member has been put on, the control of the kind of calculation of the totalizer is effected from the paper carriage by a subtraction control member 134 arranged in this column position on the paper carriage, which otherwise would become effective only at posting of the second line of the form, the left hand section of the key-board being actuated. As, however, in the preceding position of the paper carriage corresponding to column 14 the control of the kind of calculation of the totalizer from the paper carriage has been rendered ineffective and as in this column position a subtraction control member is provided, the notch 123 of link 124 is in a position corresponding to the subtraction position of the subtraction lever 119, whereas the subtraction lever 119 itself is held by the spring 121 in additive position. Consequently, at the end of the machine operation performed in the fourteenth column position the notch 123 of the link 124 comes, by returning the lever 199 to its position shown in Fig. 2, not into engagement with the pin 122 of the subtraction lever 119. A coupling of the link 124 with the subtraction lever 119 must, however, take place as in the position of the paper carriage corresponding to the column 15 the control of the kind of calculation of the totalizer from the paper carriage must be effective again. With this object in view such a gap is provided between the subtraction control member in the position corresponding to the column 14 and the subtraction control member in the position of the paper carriage corresponding to column 15, that the link 124 comes for a moment only into the position shown in Fig. 2, in which its notch 123 engages with the pin 122 of the subtraction lever 119. In this manner the amount set up on the right hand section of the key-board corresponding to the position of the paper carriage corresponding to the column 15 is entered into the right hand section of the corresponding accumulator and at the same time subtractively into the right hand section of the totalizer.

The above described arrangement controllable by the lever 97 for the interruption of the ten's carrying is necessary for such instances, in which

an error of calculation has to be corrected by introduction of the complementary value. In such a case without the interruption of the ten's carrying a "one" would be carried over into the lowest ordinal place of the left hand section of the totalizer, if a calculation error is corrected on the right hand section of the key-board. In this manner the result of an accumulator total, obtained by calculation on the left hand section of the key-board, would be wrong by the amount "1". If the lever 97 is brought into the position shown in Fig. 1, the carrying over of a one into the lowest ordinal place of the left hand sections of the accumulators and the totalizer is prevented.

The booking machine described may be used, besides for booking with split printing mechanism in double-lined booking forms, for instance for wages accounts, also for the normal booking in one line. With this object in view the following readjustings have to be carried out on the machine.

The lever 97, which interrupts in the above described manner the ten's carrying, is shifted in anti-clockwise direction from the position shown in Fig. 1, in which a pin 97a arranged on it engages in a recess 98b of a pawl 98a, so that then the pin 97a is in engagement with a notch 98c of the pawl 98a. By this shifting of the lever 97 the ten's carrying is again rendered effective. In this manner it is made possible to enter an amount into all ordinal places of the accumulators and of the totalizer, whereby use can be made of the full capacity of the machine.

Further the device for splitting the printing mechanism is rendered ineffective.

In order to render ineffective the action of the right hand section of the key-board upon the control of the kind of calculation of the totalizer from the paper carriage, the rod 224 is shifted to the left relative to Fig. 2 by means of a lever not shown and held in this position, so that lever 210 is turned in anti-clockwise direction and thereby brought out of the range of action of the rod 203.

After the readjustments mentioned herebefore have been carried out, the machine may be used in known manner for booking amounts requiring the whole width of the key-board.

In the booking machine described further provision has been made for the possibility to lock the slide 172 effecting the automatic taking of a total from the totalizer by a locking knob 279 adapted to be actuated by hand, so that slide 172, even though its projection 171 is released by the bent-off portion 170 of the bellcrank 168, 169 cannot be shifted to the right relative to Fig. 2 by the action of spring 179. As a shifting of slide 172 is prevented by the locking knob 279, automatic total taking will consequently not take place in the last column position of the paper carriage, even though a corresponding control member is provided on the paper carriage.

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