Dec. 27, 1938. H. K. F. EWALD ET AL 2,141,269

CONTROL MECHANISM FOR CALCULATING MACHINES

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Fig. 1

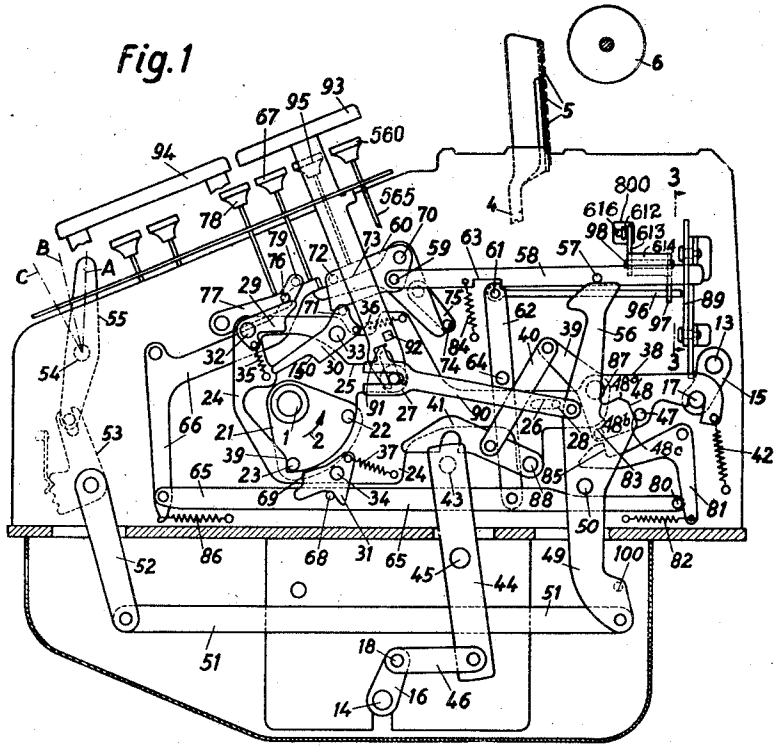
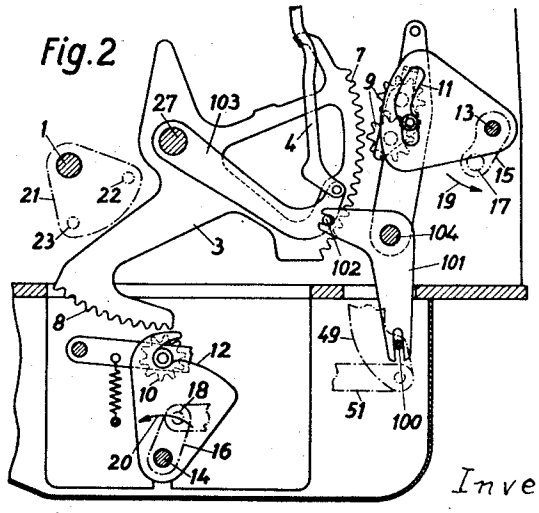


Fig. 2



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Fig. 3

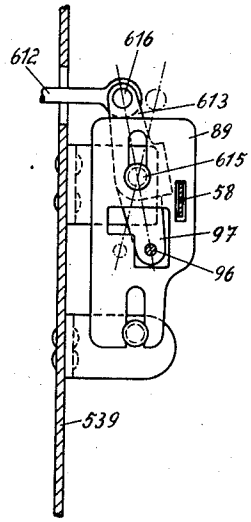


Fig. 5

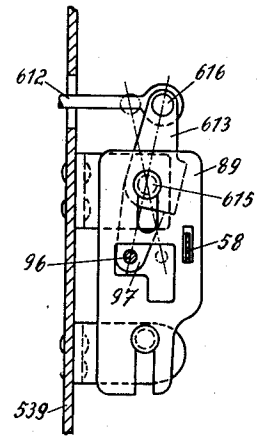


Fig. 6

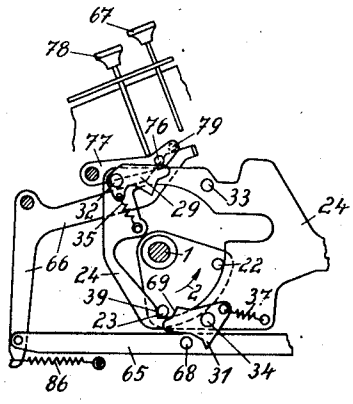
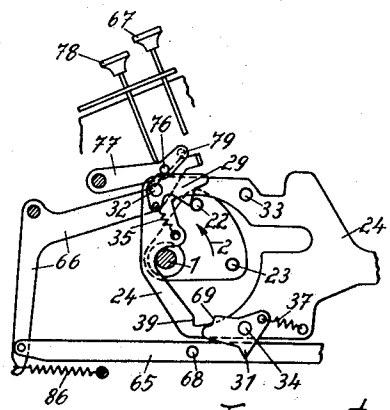


Fig. 7



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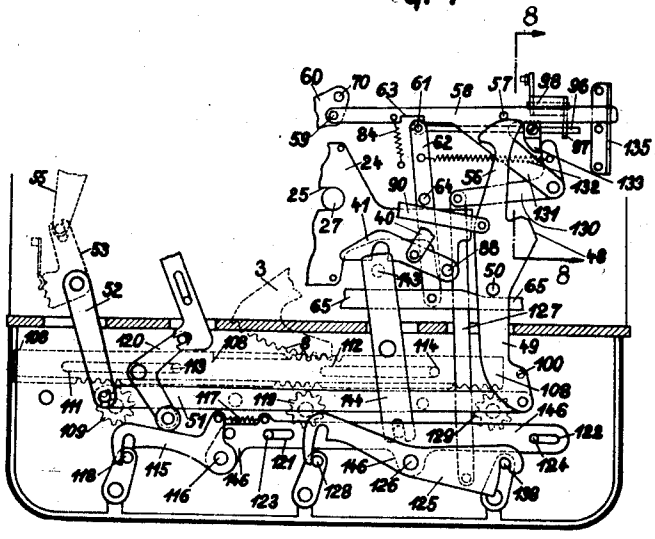
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CONTROL MECHANISM FOR CALCULATING MACHINES

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Fig. 4



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CONTROL MECHANISM FOR CALCULATING MACHINES

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Fig. 8

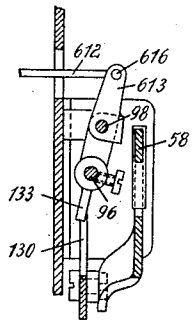


Fig. 9

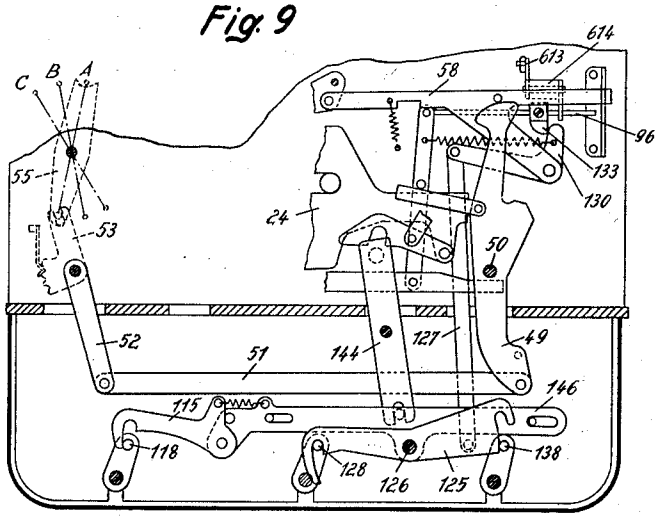


Fig. 10

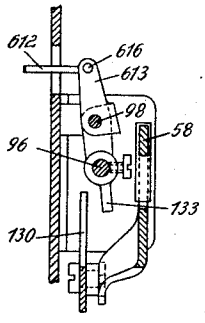
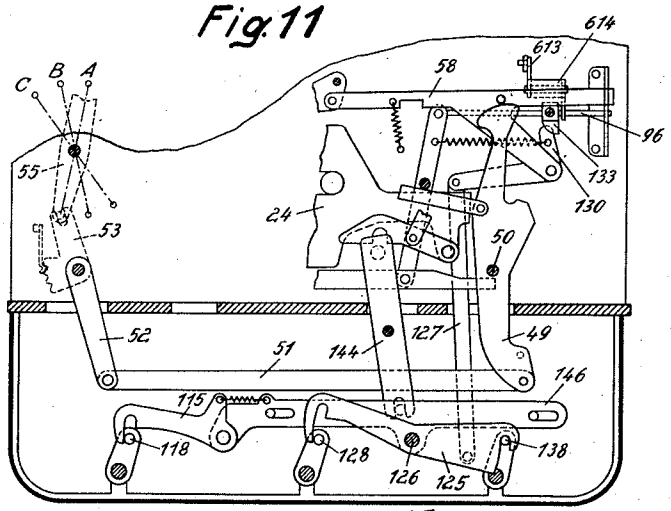


Fig. 11



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UNITED STATES PATENT OFFICE

2,141,269

CONTROL MECHANISM FOR CALCULATING MACHINES

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Application October 6, 1936, Serial No. 104,310
In Germany October 12, 1935

4 Claims. (Cl. 235—60)

This invention relates to calculating machines of the kind having a plurality of accumulators which can be brought into and out of engagement, singly or plurally, with the calculating machine actuators, and by means of a control member movable in dependency upon the machine operation.

The invention has for its primary object to provide a simple, widely applicable and reliably operating control mechanism of this kind which will be particularly suitable for small calculating machines and will be of low cost of production.

According to the present invention the control device is so connected with machine drive means, such as a rock shaft, that both during the forward stroke and the return stroke of the machine drive means there will be performed a complete operative movement effecting bringing into engagement and out of engagement one of the accumulators or a plurality thereof.

Different constructional forms of the mechanism embodying the present invention are illustrated in the accompanying drawings, in which:

Figure 1 is a side view of the calculating machine mechanism,

Fig. 2 is a side view of the accumulators and their actuators,

Fig. 3 is a section showing a device for locking the totalizer key and taken on line 3—3 of Fig. 1,

Fig. 4 is a side view of a modification,

Fig. 5 is a view similar to Fig. 3 with the parts in different positions,

Fig. 6 is a detail side view of the control means with depressed totalizer key,

Fig. 7 is a view similar to Fig. 6 with another position of the parts,

Fig. 8 is a part sectional view of a device to lock the totalizer key taken on line 8—8 of Fig. 4,

Fig. 9 is a side view of the device for the selection of different accumulators according to Fig. 4,

Fig. 10 is a view similar to Fig. 8 with another position of the parts, and

Fig. 11 is a view similar to Fig. 9 with another position of the parts.

The drawings illustrate by way of example, the application of the invention to a bookkeeping calculating machine with oscillatory drive means which in its forward stroke rocks a drive shaft 1 in the direction of arrow 2, and in its return stroke rocks said shaft in the opposite direction. A shaft 27, Fig. 2, is connected in any suitable manner to the drive shaft 1, and acutators 3 are loosely mounted on the shaft 27. To the actuators 3 are jointed type carriers 4 with types 5, Fig. 1, for printing digits and symbols in cooperation with a backing means 6, preferably a platen roll. The actuators 3 have sets of teeth 7, 8 and accumulators 9, 10 can be brought into and out of engagement with these teeth by means of cam devices 11, 12.

The actuators 3 may be operated by any suitable known means. For example, the actuators 3 are moved upwardly, in the forward stroke of the machine drive with the type carriers 4, until they reach positions corresponding either to definite numbers governed by the depressed number keys or a sum in an accumulator 9 or 10. The digit values set in this manner may be entered additively during the return stroke of the machine drive in whichever accumulator is in engagement with the actuators 3 during the downward movement of the type bars 4. If an adding and subtracting accumulator is provided, for example an accumulator as designated by reference character 9 in Fig. 2, the digit values to be recorded in the accumulator may be taken up in the accumulator in subtractive sense during the downward movement of the type bars.

The cam devices 11, 12 are fixed on shafts 13, 14 carrying at their ends levers 15, 16 fixed thereto. The levers 15, 16 have pins 17, 18, the movement of which in the direction of the arrows 19, 20, Fig. 2, causes engagement of the accumulators 9, 10 with the actuator teeth 7, 8. Similarly, during movement of the pins 17, 18 oppositely to the arrows 19, 20, disengagement of the accumulators takes place and the parts return to the initial position of Fig. 2. A coupling pawl 38 can be brought into engagement with the pin 17, which pawl is mounted on a pin 37 of the control member 24, and is held by a spring 42 in the position illustrated. The control member 24 is slidably guided on the shaft 27 and a pin 28 by means of slots 25, 26, and in its movement from the position of Fig. 1 to the right it operates the pin 17 by means of the pawl 38, thereby engaging the accumulator 9 with the actuators 3. On return movement of the control member 24 towards the left into the position shown in Fig. 1, the accumulator 9 is disengaged.

In a similar manner the accumulator 10 can be engaged with the control member 24. For this purpose a pin 33 on the control member 24 has jointed thereto a coupling pawl 41, connected by means of a link 40 with an arm 39 of the coupling pawl 38, and which can engage against

the action of the spring 42 which operates the pawl 41 by means of the arm 39 of pawl 38 and link 40, with a pin 43. The pin 43 is fixed on a lever 44 which can rotate on a bolt 45 and is connected by means of a link 46 with the pin 18. When the pawl 41 is coupled with the pin 43, the movement of the control member 24 to the right effects a left-hand movement of the pin 18 in the direction of the arrow 19 and consequently engagement of the accumulator 10 with the actuators 3. Disengagement of the accumulator 10 from the actuators 3 takes place during return movement of the control member 24 into the position of Fig. 1.

The two coupling pawls 38, 41 in the example illustrated, are so interconnected that one of them is always in operative position and the other out of operative position. For the purpose of shifting the pawls 38, 41, a striker pin 47 is provided on the pawl 38 and cooperates with a cam surface 48 on a lever 49, this cam surface 48 consisting of the bevel 48*c*, the upper edge 48*a* and the curved slot 48*b*. The lever 49 is pivotally mounted on a pin 50 on the side wall of the machine and is connected to a selector lever 55 through intermediate parts 51, 52, 53.

In the position A of the selector lever 55, turning about an axle 54 on the side wall, the striker pin 47 lies on the bevel 48*c* of the cam surface 48, Fig. 1, in such manner that the pawl 38 stands in operative combination with the accumulator 9. In the position B of the selector lever 55, the striker pin 47 lies on the upper edge 48*a* of the cam surface 48. This position of the pin 47 becomes operative from the fact that through movement of the selector lever 55 from the position A into position B the cam surface 48 of the bevel 48*c* is displaced by rotating the lever 49 clockwise, so that the pin 47 moves upward on the upper edge 48*a* of the cam surface 48. The pawl 38 is thus freed from the accumulator 9, while the coupling pawl 41 engages with the accumulator 10 by means of the pin 43. By rotation of the selector lever 55 from position B into the position C, the lever 49 is still further turned clockwise, into the curve-like slot 48*b*. This curve-like slot 48*b* of the cam surface 48 is so formed, that on engagement of the pin 47 therein the coupling member 38 again engages with the pin 17. The control member 24 is therefore coupled, in the positions A, Fig. 1, and C, of the selector lever 55 with the accumulator 9, while in the position B of the selector lever 55, it is coupled with the accumulator 10.

The accumulator 10 posesses in accordance with Fig. 2 only one set of wheels, it cannot therefore subtract but effects additions only. Accordingly, the adjustment of the machine to subtraction must be prevented, as soon as the accumulator 10 is engaged by the selector lever 55. Accumulator 10 is engaged so soon as the selector lever 55 occupies the position B. In this position of the selector lever 55 the setting of the machine for subtraction is prevented in the following manner. A rod 90 on the shaft 27 is connected to the lever 49. This rod 90 carries on the left end a lug 91, which engages with the nose 92 of the subtraction switch bar 93 as follows. In the position A of the selector lever 55, as seen in Fig. 1, the lug 91 occupies a position to the left of the nose 92 of the subtraction switch bar 93. On depressing the subtraction switch bar 93 the nose 92 may without contact pass the lug 91, e. g., the bar 93 can be depressed, whereby the adjustment of the machine to subtraction becomes possible. In position B of the selector lever 55, the lug 91 occupies a position in the path of the nose 92, so that depression of the rod 93 and therewith setting of the machine for subtraction becomes impossible. In the position C of the selector lever 55, the lug 91 occupies a position to the right of the nose 92. In the position C of the selector lever 55, therefore, the machine may again be adjusted to subtraction, since the subtraction motor switch bar 93 can be depressed. In the positions A and C of the selector lever 55 it becomes possible to adjust the machine to subtraction, since in these positions of the selector lever 55 the subtracting accumulator 9 is selected.

The position A differs from the position B and C in that an upper arm 56 of the lever 49 lies below a pin 57 on a rod 58, while in the positions B and C the arm 56 lies to the right of the pin 57. In the positions B and C, the rod 58, which is guided at its right end by a slide 89 and is pivoted at its left-hand end on a pin 59 on a lever 60, can move downwardly under the action of a spring 84, whereby a pin 61 enters a recess in the rod 58.

The movement of the control member 24 to the right in Fig. 1, and the return movement, are effected by the machine drive means, for which purpose a drive disk 21 is fixed on the drive shaft 1 and is provided with pins 22, 23. These pins 22 and 23 during each machine operation, oscillate in the direction of the arrow 2 and in the return direction. As connecting parts between the pins 22, 23 and the control member 24, there are provided pawls 29, 30 and 31 pivoted on pins 32, 33 and 34, on the control member 24, which pawls are held by springs 35, 36, 37 in the positions of Fig. 1.

If the control member 24 at the beginning of the outward stroke of the machine drive 1 is to be moved to the right, then by means of a rod 65 a pin 68 thereon is moved to the left whereby the pawl 31 brings its shoulder 69 in front of the drive pin 23 under the action of the spring 37. This is effected by turning a bell crank lever 66 in clockwise direction during the taking of a total or a sub-total. In this operation the drive pin 23 at the beginning of its rotation in the direction of arrow 2, strikes against the pawl 31 and shifts the control member 24 to the right thereby bringing the operative accumulator into engagement. For taking sum totals, the coupled accumulator must at completion of the forward movement of the machine drive be released from connection with the actuators 3. This is effected by means of the pawl 29, Fig. 1, which is brought into the path of the drive pin 22 by depression of the total key 78. The rod of the key 78 forces the lever 77 downward, whereby the pin 76 attached to the lever 77 swings the pawl 29 into the position shown in Fig. 6. The drive pin 22 contacts the pawl 29, Fig. 7 at the end of the forward movement of the machine drive, to which it moves in the direction of the arrow, thus moving the pawl and therewith the control member 24 toward the left. In this instant, the accumulator coupled to one of the members 38, 41 will be freed from the drive members 3.

In sub-total taking, the accumulator in engagement with the actuators 3, during the forward stroke of the machine drive disc 21, is not disengaged until the end of the operation of said disc by the striking of the pin 23 against a shoulder 39 on the control member 24. The pawl 29 is not actuated in taking subtotals, and

the pawl 30 may be in or out of operative position.

The pawl 30 has generally the position shown in Fig. 1. The pin 22 during the forward stroke of the machine drive in the direction of the arrow 2, passes along the pawl 30 and at the end of said stroke comes to lie behind a shoulder 150 on said pawl. Thereby, at the beginning of the return stroke, the drive of the pawl 30 by the pin 22 and right-hand movement of the control member 24 takes place to engage the accumulator for adding or subtracting operations, which, in the machine illustrated, are to be carried out during the return stroke of the disc 21. The disengagement of the accumulator is effected by the return movement of the control member 24, acting through the parts 23, 39, at the end of the machine operation.

With the pawl 30 in the position of Fig. 1, if the motor drive is switched in by actuation of a motor switch bar 94 operating through parts not illustrated, then an amount set up on the keyboard of the machine is added in the accumulator 9 with the selector lever 55 set at A or C. The actuation of the subtraction motor switch bar 93, on the contrary, with the selector lever 55 in the same positions A or C, produces a subtraction in the accumulator 9. In the position B of the selector lever 55, actuation of the motor switch bar 94, with the pawl 30 in the position shown, effects an addition in the accumulator 10. The switch bar 93 for subtraction is locked in the position B of the selector lever 55.

For setting the machine to non-addition, the pawl 30 is shifted out of the path of the pin 22 whereby the drive disc 21 produces no movement of the control member 24 either in its forward stroke or in its return stroke. The shifting of the pawl 30 into its inoperative position is effected by a pin 71 which is moved downwardly by the lever 60, for example on actuation of a non-add key 95. Simultaneously and by means of a pin 72, a bell crank 73 is operated which acts through a pin 74 and a lever 75 to engage the motor drive for a machine operation.

Setting the machine for total or sub-total taking may be effected, for example, by means of keys 78, 67 or in any other manner. The drawings show the total key 78 arranged above a lever 77 which has a pin 76 which operates the pawl 29 and also a pin 79 which actuates the bell cranks 66, 73, and the motor drive by the lever 75, and at the same time moves the rod 65 to the left. The sub-total key 67 is similarly arranged but it operates directly on the bell crank 66 in order to engage the motor drive by the lever 75 and to effect moving to the left of the rod 65, for influencing the pawl 29.

During the left-hand movement of the rod 65, not only is the pawl 31 released by the pin 68, but a pin 80 arranged at the right-hand end of the rod 65, and the connection of the rod 65 with the lever 62, effect different shifting operations. By means of the pin 80 a lever 81 is released for movement by a spring 82 until an upper arm 85 of the lever 81 rests against a pin 83 on the connecting member 38. The connection of the rod 65 with the lever 62 has the following effect.

In the positions B and C of the selector lever 55, the pin 61 of the lever 62, which is pivoted on a fixed pin 64, lies in the recess 63 of the rod 58. If in this position of the pin 61 the total key 78 or the sub-total key 67 is actuated, then left-hand movement of the rod 65 produces a right-hand movement of the rod 58, which results in the rotation of the lever 60 about the pin 70 and a swinging out of the pawl 30. In the position A of the selector lever 55, however, the pin 61, upon actuation of key 78 or 67, passes below the recess 63 and the pawl 30 remains in its working position.

The machine, when the total key 78 is actuated with the selector lever 55 in position A, operates in the following manner:

Simultaneously with the switching in of the motor drive by the parts 73, 74, 75, the pawls 29, 31 are brought into operative position, the pin 61 passes idly below the recess 63, and the pin 80 releases the upward movement of the arm 85. Thereupon, the parts 23, 31, at the beginning of the forward stroke of the machine drive means shift the control member 24 to the right and cause the accumulator 9 to be engaged by the coupling pawl 38. The pin 83 of the pawl 38 moves in this operation towards the right along the upper edge of the arm 85, the arm 85 hooking itself behind the pin 83. At the end of the forward stroke the pin 22 passes over the pawl 30 and strikes against the pawl 29, thus moving the control member 24 again to the left and bringing the accumulator 9 out of engagement with the actuators 3. At the end of this disengaging movement, the pin 83 strikes against a cam surface of the arm 85 and shifts the coupling pawls 38, 41 in such a manner that the accumulator 9 disengages from the control member 24 and the accumulator 10 is connected by the pin 43 with the coupling pawl 41. In this position, at the end of the foreward stroke, the drive pin 22 finds itself in operative position behind the shoulder 150 so that it again moves the control member 24 to the right by means of the pawl 30. In the return stroke of the disc 21 the control member 24 therefore engages the other accumulator 10. The accumulator 10 remains engaged until at the end of the return stroke the pin 23 strikes the shoulder 39 and shifts the control member 24 again to the left. The control member 24 thus performs a complete operative movement for engaging and disengagaing an accumulator, both in the forward stroke and in the return stroke of the machine drive disc 21. During this operation the total in the accumulator 9 is transferred to the accumulator 10.

When it is desired that only positive totals shall be transferred from the accumulator 9 to the accumulator 10, mechanism of the following kind is provided:

A rod 96 is connected to the pin 61 in a manner permitting the rod to move also at right angles to the plane of the drawings. The rod 96 extends at its right-hand end through a lever 97 which moves automatically counterclockwise about an axis 98, Fig. 3, when the accumulator 9 has a positive content. If the content of the accumulator 9 is negative, the lever 97 and the rod 96 assume the position indicated in broken lines in Fig. 3. The rod 96 is in its position of rest, with its right-hand end according to Fig. 1 in front of a slide 89 which can be moved up and down by the rod 58. The slide 89 is provided with an angular slot 99 and in its upper position shown in Fig. 3, allows passage of the rod 96 into the slot only when the accumulator 9 has a positive content. If it is attempted with the slide 89 in the upper position, that is with the selector lever at position A, to actuate the total key with a negative content in the accumulator 9, then the rod 96 cannot pass through the slot in the slide 89. The actuation of the total key is thus locked when

there is a negative accumulator content, against transmitting totals. In the lower position of the slide 89, on the other hand, when the selector lever 55 is in the position C, actuation of the total key 78 allows positive and negative totals to be taken without obstruction by the slide 89. By suitable arrangement of the angular slot 99 it may be provided that only negative totals can be taken from the accumulator 9 and transferred to the accumulator 10. Upon actuation of the sub-total key 67 with the selector lever 55 in position A, the machine works as follows:

Simultaneously with the switching in of the motor drive by the parts 73, 74, 75, the pawl 31 is brought into operative position. The pin 61 swings idly below the recess 63 of the rod 58 and the pin 80 of the rod 65 releases movement of the lever 81 whereby the arm 85 can bear against pin 83. At the beginning of the forward stroke of the machine drive disc 21, the drive pin 23 acts through the pawl 31 to move the control member 24 to the right and to bring the accumulator 9 into engagement with the actuators 3, while the pin 83 slides on the upper edge of the arm 85. The accumulator 9 remains in engagement during the forward stroke and return stroke of the machine drive disc and the pin 22 passes idly over the pawl 30. The accumulator 9 can be disengaged only when at the end of the machine operation the parts 23, 39 effect return of the control member 24 into the illustrated position. In this operation it is immaterial that at the end of the return movement of the control member 24, the pin 83 effects a shifting of the coupling pawls 38, 31, because this shifting necessary for transmitting totals, remains inoperative in the present case since in this machine operation an operative movement of the control member 24 to the right and return to the left does not again occur. The shifting of the pawls 38, 41 is indeed prevented at the end of the machine operation, by the key 67 returning to normal position, and the rod 65 is caused by its spring 86 to act upon the lever 81 in such a manner that the parts 85, 83 come out of engagement with each other and the coupling pawls 38, 41 return to the position of Fig. 1 under the action of the spring 42. In the machine illustrated the result is achieved that sub-totals cannot be transferred from the accumulator 9 to the accumulator 10, even when the selector lever 55 is in the position A. In the positions B and C of the selector lever 55, the rod 58 always assumes its lower position, so that the pin 61 is located within the recess 63. Thereby upon actuation of key 78 or 67, the pawl 30 is always disengaged by means of the parts 62, 70, 61. Thus the pawl 30 can never produce a second to-and-fro movement of the control member 24 during the return stroke of the machine drive and resulting actuation of the coupling pawls 38, 41 shifted at the end of the return movement of the member 24 by the parts 23, 85 to engage an accumulator, in the same machine operation. Thus with the selector lever in position B a total is taken by actuating the total key 78, then this is taken out of the accumulator 10 in the forward stroke of the machine drive disc in the direction of the arrow 2, and the upward movement of the actuators and the type bars 4, and the accumulator 10 is again disengaged at the end of the forward stroke, since the drive pin 22 operates together with the pawl 29, which pawl 29 through depression of the total key 78, Figs. 6 and 7, is swung into its active position. The drive pin 22 shifts, as described in the foregoing, with the aid of the pawl 29, the control member 24 again to the left and thereby disengages the accumulator 10 from the actuators 3. In similar manner it is clear that with the selector lever 55 in position C, the total can be withdrawn from the accumulator 9. On setting the machine for sub-total taking by means of the key 67, the accumulator 10 in the position B of the selector lever 55 and the accumulator 9 in the position C of the said lever 55, is engaged at the beginning of the machine operation and is disengaged at the end of the machine operation.

According to Fig. 2, a pin 100 is provided at the lower end of the lever 49, and engages a bell crank lever 101 pivoted at 104. The bell crank lever 101 has its upper arm actuating a pin 102 on a lever 103 loosely mounted on the shaft 27. The lever 103 is connected with the type carrier 4 which has a type 5 for each position of the selector lever 55. By means of this connection, simultaneously with the actuation of the selector lever 55, symbols corresponding to the positions A, B and C are set. Obviously suitable symbol printing means of any known kind can be provided.

It is evident that the number of coupling pawls 38, 41 for producing connection of the control member 24 with the accumulators, is in no wise limited. Each coupling pawl may be operatively associated with a plurality of accumulators. For example, the actuator teeth 8 (Fig. 4) instead of engaging the accumulator 10 may engage a rack 108 guided by means of slots 111, 112, and pins 113, 114, and which can be brought int engagement with several accumulators 109, 119, 129. The movement of the accumulators into and out of engagement with the rack 108 is effected by crank pins 118, 128, 138 in similar manner as in the case of the accumulator 10 of Fig. 2 operated by the crank pin 18. A coupling pawl 115 engages the pin 118, said pawl being pivoted on a pin 116 on a rod 146. The engagement of the pawl 115 may be effected against the action of spring 117 by rotating a bell crank lever 120, moved manually or automatically, for example by the paper carriage.

To engage the accumulator 109 to be engaged with the actuators 3, 8, 108, by means of a left-hand movement of the crank pin 118, the pivot pin 116 of the pawl 115 is mounted on the rod 146 which is guided for longitudinal sliding by slots 121, 122 and pins 123, 124, and which can be coupled by means of a pin 143 on a lever 144, with the pawl 41. In view of this connection the accumulator 109 can be brought into and out of engagement with its actuators, similarly to the accumulator 10.

Crank pins 128, 138 serving for the engagement and disengagement of the accumulators 119, 129 are in operative connection with a coupling pawl 125 pivoted on a pin 126 on the rod 146. In the position of Fig. 4 the pawl 125 is in engagement with the crank pin 138. In this case, upon right-hand movement of the coupling pawl 41 and of the pin 143, the pin 138 is driven in the left-hand direction for engagement of the accumulator 129. By turning of the pawl 125 in anti-clockwise direction, the pin 138 is released and the pin 129 is brought into engagement with the pawl 125 whereby the movement of the pin 128 is coupled with the movement of the pawl 41. Thereby the accumulator 119 can be brought into and out of engagement with the rack 108. In an intermediate position of the pawl 125, the pins 128, 138 are disconnected. A shifting of the pawl

125 may be effected in response to the presence of a positive or negative condition of the accumulator 9 for which purpose the pawl 125 is connected by a rod 127 with a bell crank lever 130 jointed to an arm 131 of the rod 58 and drawn by spring 132 constantly in clockwise direction.

When the rod 58 is in its upper position by action of the arm 56 and the pin 57, with the selector lever 55 in position A, the upper arm of the bell crank lever 130 lies on a level with a contact member 133 fixed on the rod 96. The rod 96 which rocks to and fro with the arm 97, assumes its right-hand position, Fig. 10, when the accumulator 9 has a positive content, and when the accumulator has a negative content it assumes its left-hand position, Fig. 8. In the position of Fig. 8, the rod 96 and the shoulder 133 lie in a plane with the crank lever 130, while in the position in accordance with Fig. 10 the rod 96 with the shoulder 133 can move by the crank lever without contact, Fig. 24. Accordingly, only with a negative accumulator content, Fig. 8, will a shift of the pawl 125 take place by means of the shoulder 133, the crank lever 130 and the rod 127, Fig. 9, so that instead of the accumulator 129 the accumulator 119 becomes engaged.

As a result of this arrangement, with the selector lever 55 in position A and with a positive amount in the accumulator 9, actuation of the total key 78 produces no shift of the pawl 125 and therefore positive totals in the accumulator 9, in the return stroke of the machine drive disc, are automatically transferred into the accumulator 129, Fig. 11. Furthermore with the lever 55 in position A, and with a negative content in the accumulator 9, on actuating the total key 78, the bell crank lever 130 is driven by the parts 62, 96, 133 and the right-hand part of the pawl 125 is raised. Thereby the pin 128 comes into engagement with the pawl 125, and the accumulator 119 is automatically operated to receive the negative total from the accumulator 9, Fig. 9.

On actuation of the sub-total key 67 in the position A of the selector lever 55, there also takes place a selective movement of the accumulators 119, 129, the latter remaining inoperative in the machine illustrated, because no working movement of the control member 24 takes place, with the pawl 41 in engagement with the pin 143. Since by depression of the sub-total key 67, Fig. 1, only the crank lever is turned, without any downward movement of the lever 77. Consequently, the pawl 29 does not move into the path of the control pin 22 by means of the pin 76 of the lever 77. The control pin 22 of the cam 21, therefore, at completion of the forward movement of the machine drive, does not move the control member 24 again to the left. Only after completion of the backward movement of the machine drive is the control member 24 moved to the left by means of the control pin 23 from contact with the projection 39 of the control member 24. The control member 24 performs during the forward and backward movement only a back and forth movement, for which reason the automatic coupling of the pawl 41 with the pin 143 is dispensed with. In the positions B and C of the lever 55 the arm 56 is to the right of the pin 57 and the rod 58 has moved downwardly in its guide 135. Thereby also the arm 131 reaches its lower position in which the bell-crank lever 130 lies below the contact member 133. Means may be provided by which the pawl 125 is brought into its inoperative middle position when the selector lever 55 is moved to position B or C.

The spring 132, at the end of the machine operation, brings the pawl 125 into the position of rest of Fig. 4.

For taking a total from one of the accumulators 109, 119, 129 the lever 55 must be set to position B. The selecting of the desired accumulator may be performed by suitable means for shifting the pawls 112, 125. Locking means may be provided for preventing that on taking a total more than one accumulator can be brought into engagement.

I claim as my invention:

1. In a calculating machine having calculating mechanism including actuators and a plurality of accumulators; means for shifting each accumulator into and out of engagement with the corresponding actuators; keys for controlling the total taking from said accumulators; selector means for determining which accumulator shifting means is to be made operative; a control member operably connectable to the selected shifting means; means including an oscillatory member for moving the control member to effect a complete shifting operation of at least one selected accumulator during the forward stroke and of another accumulator during the return stroke of said member, said shifting operation including bringing said accumulator into and out of engagement with the corresponding actuators; and means for changing the connection of the control member from one shifting means to another during the operation of the oscillatory member whereby different accumulators are shifted by the forward stroke and return stroke respectively of the oscillatory member.

2. In a calculating machine having calculating mechanism including actuators and a plurality of accumulators; means for shifting each accumulator into and out of engagement with the corresponding actuators; keys for controlling the total taking from said accumulators; selector means for determining which accumulator shifting means is to be made operative; a control member operably connectable to the selected shifting means; means including an oscillatory member for moving the control member to effect a complete shifting operation of at least one selected accumulator during the forward stroke and of another accumulator during the return stroke of said member, said shifting operation including bringing said accumulators into and out of engagement with the corresponding actuators; and a driving connection between the control member and the oscillatory member, part of said driving connection being movable between operative and inoperative position by the total keys under control of said selector means to cause said control member to effect a complete engagement and disengagement operation of only one selected accumulator.

3. In a calculating machine having calculating mechanism including actuators and a plurality of accumulators; means for shifting each accumulator into and out of engagement with the corresponding actuators; keys for controlling the total taking from said accumulators; selector means for determining which accumulator shifting means is to be made operative; a control member; a coupling pawl between said control member and each accumulator shifting means, each of said pawls being movable to connect and disconnect said control member and shifting means; means including an oscillatory member

for moving the control member to effect a complete shifting operation of at least one selected accumulator during the forward stroke and of another accumulator during the return stroke of said member, said shifting operation including bringing said accumulator into and out of engagement with the corresponding actuators; and means effective during movement of said oscillatory member to move said coupling pawls.

4. Machine according to claim 2 in which the driving connections between the control member and the oscillatory member include a member which on actuation at the beginning of the return stroke of the machine drive means effects a movement of the control member for engaging one or a plurality of accumulators in dependence on the position of the selector lever, said connecting member being shiftable in dependence on the position of the lever and by operation of the total taking key.

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