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ZERO PRINTING CONTROL DEVICE FOR A CALCULATING MACHINE

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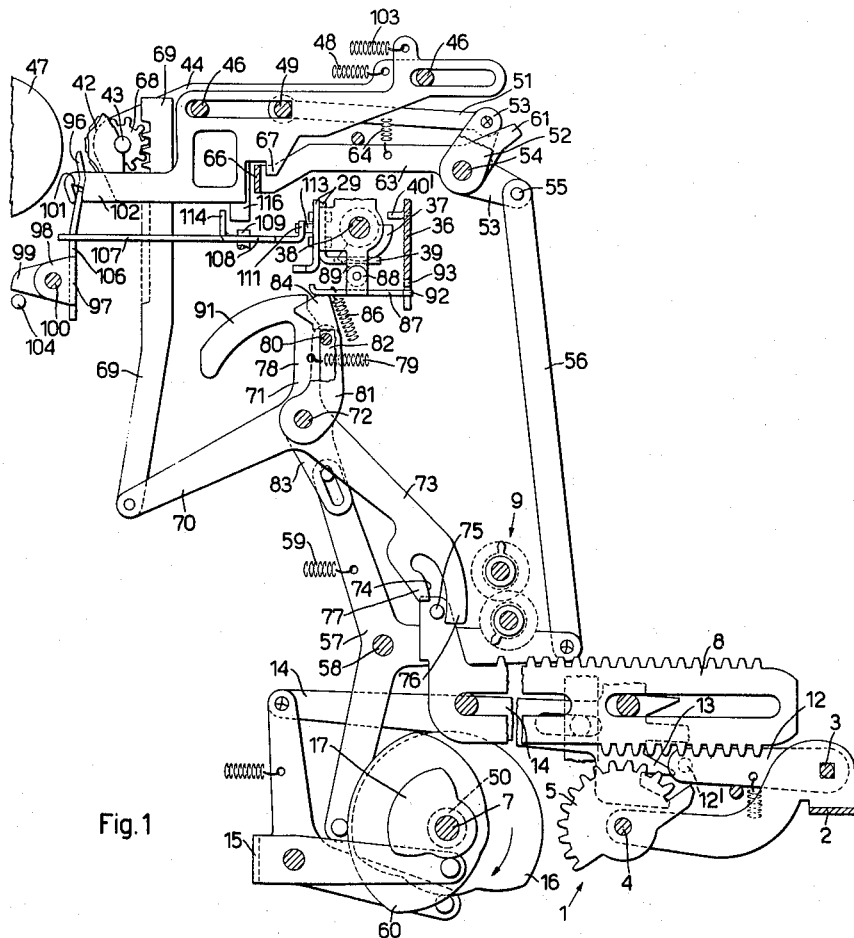


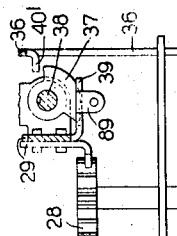
Fig. 1

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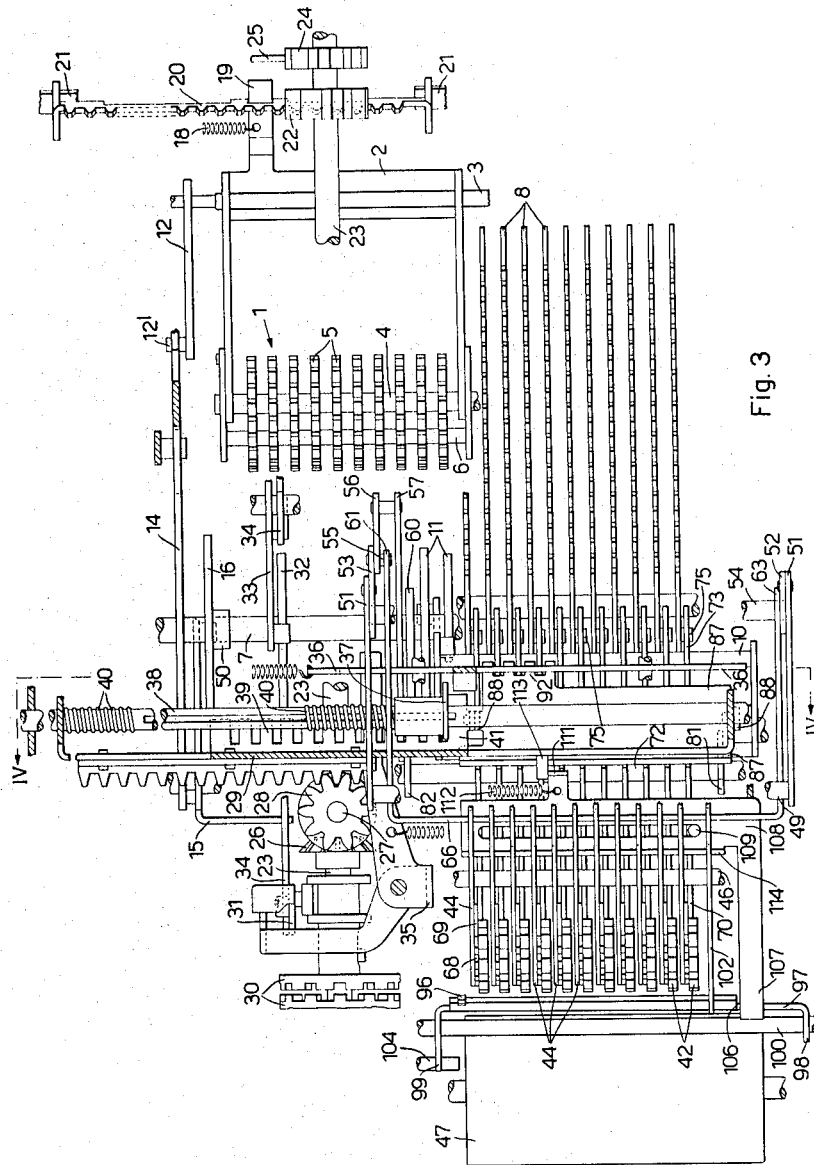


Fig. 3

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ZERO PRINTING CONTROL DEVICE FOR A CALCULATING MACHINE

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8 Claims. (Cl. 235—60.25)

This invention relates to a zero printing control device for a calculating machine having a set of typecarriers presettable according to a multiorder amount by a set of actuators differentially movable from a zero position, comprising a common member for preventing said typecarriers from printing, and a sensing member connected to said common member for concomitant movement in the transverse direction.

In the known calculating machines the typecarriers at left of the highest significant order of the amount to be printed are prevented from printing zeros by individual zero control members, each one adapted to be displaced to an ineffective position when the corresponding actuator is moved from its zero position, or in the case the corresponding actuator has not been moved by a displaced control member of a higher order. Therefore, the known zero printing control devices require too many parts and, due to the various clearances between each control member and the next following, it requires a very long stroke for displacing said control members. Said devices thus operate at a rather slow speed and are intricate and expensive to manufacture.

In a known accounting machine has been proposed a zero printing control device comprising a common member adapted to be moved from left to right until arrested by the typecarrier connected to the actuator of the highest significant order for preventing the typecarriers of the left of said actuator from printing zeros. However, the shock of the common member against said typecarrier may perturbate the movement of both the actuator of the highest order and the common member.

These disadvantages are obviated by the zero printing control device according to the invention, which is characterized by moving means for moving said common member and said sensing member from right to left before said typecarriers are caused to print, said sensing member being adapted to simultaneously sense said actuators perpendicular to said transverse direction and to disable said moving means when all the sensed actuators are in said zero position to condition said common member for preventing the typecarriers at left of the highest significant order of said amount from printing zeros.

According to another characteristic of the invention a set up mechanism settable order by order is transversely movable together with said sensing member, whereby before said typecarriers are caused to print both said sensing member and said mechanism are always aligned according to the highest significant order by said amount.

Other characteristics and advantages of the invention will become apparent from the following description of a preferred embodiment thereof, and from the accompanying drawings, wherein:

FIG. 1 is a left hand longitudinal partial sectional view of a calculating machine embodying a zero printing control device according to the invention;

FIG. 2 is another longitudinal partial sectional view of the machine of FIG. 1;

FIG. 3 is a partial plan view of the machine of FIG. 1;

FIG. 4 is a partial sectional view taken on the line IV—IV of FIG. 3.

The zero printing control device according to the invention is embodied in a ten key calculating machine.

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With reference to the drawings, the calculating machine comprises a set up mechanism formed of a set up carriage 1 settable order by order through a ten key keyboard not shown in the drawings.

The carriage 1 (FIGS. 2 and 3) comprises a bail 2 transversely slidable on a square shaft 3 and carrying a shaft 4. The carriage 1 comprises also in each order a variably settable element or toothed sector 5 rotatably mounted on the shaft 4. Normally, when the carriage 1 is located in the right position shown in FIG. 3, the sectors 5 are variably rotated clockwise from the zero position shown in FIGS. 1 and 2, according to an amount set up therein.

The sectors 5 may be zeroized by zeroizing means comprising a universal bar 6 (FIG. 2) adapted to be rocked counterclockwise by a cyclically operating mechanism formed of a main shaft 7 rotatable clockwise through 360 degrees for each machine cycle. The universal bar 6 is operated by the shaft 7 when effecting an actuating machine cycle wherein a set of actuators, each one comprising a reciprocable rack 8, are differentially moved either under the control of the sectors 5 of the carriage 1 for accumulating the set up amount into a totalizer 9, or under the control of the totalizer 9 for taking a total. A pair of cams 11 of the shaft 7 are adapted to reciprocate a universal bar 10 cooperating with the racks 8 through a forward and a return stroke, whereby in an accumulating cycle the forward stroke of the racks 8 is positively effected by the universal bar 6 through the sectors 5 engaged therewith, whereas the return stroke of the racks 8 and the sectors 5 is positively effected by the universal bar 10.

Secured to the shaft 3 of the carriage 1 is an arm 12 (FIG. 1) having a pin 12' adapted to be engaged by a projection 13 of a slide 14 to engage the sectors 5 with the racks 8. The slide 14 is connected to a bail 15 operable by a cam 17 secured to the shaft 7, as well as by a cam 16 secured to a hub 50 adapted to be secured to the shaft 7 during the cycles wherein an amount is accumulated. The bail 2 is urged rightwards by a spring 18 (FIG. 3) and it is provided with a projection 19 engaging a notch of a rack 20 transversely slidable on a second square shaft 21. The rack 20 engages a pinion 22 secured to a longitudinal shaft 23. Another pinion 24 secured to the shaft 23 is normally locked by a lever 25 against the urge of the spring 18.

The shaft 23, through a pair of bevel gears 26, a vertical shaft 27 and a pinion 28, causes a slide 29 to be transversely moved together with the rack 20 and the carriage 1. Particularly, the shaft 23 is adapted to be rotated by moving means comprising a clutch 30 controlled by a lever 31 (FIG. 2) and adapted to connect the shaft 23 with an electric motor not shown in the drawings. The clutch 30 is normally disengaged and may be engaged by moving a link 34 forwards to rock the lever 31 counterclockwise. The link 34 is controlled by a member 45 adapted to assume the position of FIG. 2 when the carriage 1 is in the right position of FIG. 3, to enable the link 34 to be engaged by a lever 33 cooperating with a cam 32 of the main shaft 7. The member 45 is also adapted to be displaced forwards when the carriage 1 is out of said right position. The lever 31 may be returned in the position shown in FIG. 2 by rocking a bail 35 (FIG. 3) clockwise under the control of a member settable according to the number of order of the amount set up on the carriage 1. More particularly, said member is formed of a sector 37 (FIG. 2) bodily rockable with, but axially slidable on a shaft 38, and variably engageable with a toothed edge 39 (FIG. 3) of slide 29 according to said number of orders, even when the carriage 1 is located in its right position. When the first order of a new amount is set up, the sectors 5 (FIG.

2) which were rocked according to a previous set up amount are zeroized, whereas the sector 37 is rocked counterclockwise to disengage the toothed edge 39. The sector 37 is thus urged leftwards by a compression spring 40 (FIG. 3) to contact a shoulder 41 of the slide 29. Then the sector 37 (FIG. 2) reengages the toothed edge 39 in such an intermediate position as to enable the sector 37 when additionally displaced leftwards to engage a bent lug 40' of a transverse slide 36 (FIG. 4). Furthermore, when each order of an amount is set up the lever 31 is rocked counterclockwise to engage the clutch 30, which concomitantly displaces leftwards the rack 20, the carriage 1, slide 29 and the sector 37. This latter engages now the lug 40' and displaces leftwards the slide 36 which rocks the bail 35 (FIG. 3) clockwise thus disengaging the clutch after one step of the carriage 1.

The calculating machine is also provided with a set of type-carriers each one formed of a typewheel 42 (FIG. 1) fulcrumed on a pivot 43 of a slide 44 slidably mounted on two stationary shafts 46 and adapted to bring the typewheel 42 against a platen 47. Each slide 44 is normally urged by a spring 48 to contact a universal bar 49 secured to a pair of links 51 linked to a pair of arms 52 and 53 secured to a shaft 54 rockably mounted on the machine frame. The arm 53 is connected through a pin 55 to a link 56 linked to a lever 57 pivoted at 58 and urged by a spring 59 to contact a cam 60 of the main shaft 7. The pin 55 is adapted to engage a projection 61 of a bail 63 fulcrumed on the shaft 54 and normally urged by a spring 64 to contact a stationary stop member. A transverse portion 66 of the bail 63 is normally located on the path of a projection 67 provided on each slide 44.

Secured to each typewheel 42 is a pinion 68 engaging a rack 69 linked to a first arm of a three-armed lever 71 pivoted on a stationary shaft 72. A second arm 73 of the lever 71 is provided with a notch located between two projections 76 and 77 and adapted to cooperate with a pin 75 secured to the corresponding rack 8. The projection 77 is shorter than the projection 76 to enable the racks 8 to be displaced rearwards without affecting the corresponding levers 71. A third arm 78 of the lever 71 is normally urged by a spring 79 to contact a universal bar 80 secured to a pair of levers 81 and 82 fulcrumed on the shaft 72. An arm 83 of the lever 82 is pin and slot connected with the lever 57.

The calculating machine is provided with a zero printing control device comprising a common member for preventing the typewheels 42 from printing. More particularly, said common member is formed of a slide 108 (FIG. 3) transversely slidable on a stationary pin 109 and provided with a bent lug 111 normally urged by a spring 112 to contact a pin 113 secured to the slide 29. The slide 108 is provided with a bent edge 114 located on the path of a projection 116 (FIG. 1) of each slide 44. Furthermore the zero printing control device comprises a sensing member formed of a plate 87 having a pair of bent lugs 88 rockably mounted on a corresponding pair of lugs 89 of the slide 29 (FIG. 3), whereby the plate 87, the slide 108 and the carriage 1 may be concomitantly moved in the transverse direction by the slide 29. The plate 87 is normally urged by a spring 86 (FIG. 1) to contact a projection 84 of the lever 81 and it is adapted to simultaneously sense the upper edge of an arcuate projection 91 provided on each arm 78. The plate 87 is also provided with a toothed edge 92 (FIG. 3) adapted to engage a similar toothed edge 93 (FIG. 4) of the slide 36.

The machine is also provided with a decimal point printing member formed of a slide 97 (FIG. 1) provided with two bent lugs 98 and 99 slidably and rockably mounted on a stationary shaft 100 and with a projection 96 for printing the decimal point on the platen 47. The slide 97 is further slidable into a notch 101 of a slide 102, and it is provided with a shoulder 106 (FIG. 3) adapted to cooperate with a projection 107 of the slide

108. The slide 102 (FIG. 1) is slidably mounted on the shafts 46 at left of the slides 44 and it is urged by a spring 103 to contact the universal bar 49. Similarly to the slides 44, the slide 102 is provided with a projection 67 adapted to cooperate with the transverse portion 66 of the bail 63, but it is deprived of the projection 116. In FIG. 3 the slide 97 locates its projection 96 at right of the typewheel 42 (FIG. 3) of the lowest order and its lug 99 above a stationary pin 104. The slide 97 is adapted to be transversely moved manually or automatically in any known manner to locate the lug 99 at left of the pin 104 and to set the projection 96 between two predetermined adjacent typewheels 42.

The zero printing control device operates as follows.

At first it is assumed that the slide 97 is located in the position of FIG. 3. In the case an amount set up into the carriage 1 is to be accumulated into the totalizer 9, by depressing a corresponding motor key a cycle of the shaft 7 together with the hub 50 is effected. The carriage 1, the slide 29 and the platen 87 either have been shifted leftwards step by step when the amount has been set up, or they will be tabulated at the beginning of the cycle by a cam of the hub 50 not shown in the drawings under the control of the sector 37 when the carriage 1 has been previously returned rightwards, whereby the rocked sectors 5 are located in correspondence with the racks 8. In any case the pin 113 of the slide 29 through the lug 111 moves the slide 108 leftwards and locates the bent edge 114 at the left of a number of slides 44 equal to the number of orders of the amount set up into the carriage 1, whereby the edge 114 is already positioned for preventing the typewheels 42 at left of the highest significant order of the set up amount from printing zeros.

When the cam 16 (FIG. 1) of the hub 50 rocks the bail 15 clockwise, the slide 14 through the projection 13 and the arm 12 engages the sectors 5 with the racks 8. Thereafter the two cams 11 (FIG. 2) displace the universal bar 10 rearwards, while the universal bar 6 zeroizes the sectors 5 to differentially move the racks 8 according to the set up amount. Simultaneously, the cam 60 (FIG. 1) causes the lever 57 to be rocked counterclockwise, whereby through the arm 83 the lever 82 is rocked clockwise together with the universal bar 80 and the lever 81. The universal bar 80 causes thus the projection 76 of each lever 71 to follow the pin 75 of the corresponding rack 8, and the racks 69 through the pinions 68 to rotate the corresponding typewheels 42 according to said amount. After the universal bar 80 has been displaced clockwise according to one step of the racks 8, the projection 84 of the lever 81 releases the plate 87, which now simultaneously senses the projections 91 of the levers 71 at the left of the highest significant order of the set up amount. Since these levers 71 have not been rocked from their zero position, the plate 87 is immediately rocked counterclockwise by the spring 86 and engages with its toothed edge 92 the toothed edge 93 of the slide 36, but this engagement has no effect on the clutch 30 (FIG. 3), which is already disengaged.

The lever 57 (FIG. 1) when rocked counterclockwise, through the link 56, arm 53, shaft 54, arm 52 and the links 51, moves the universal bar 49 rearwards. The slides 44 and 102 urged by their springs 48 and 103, respectively, contact now with the projections 67 the transverse portion 66 of the bail 63. The pin 55 of the arm 53, during the last portion of its stroke, engages the projection 61 of the bail 63 and releases the slides 44 and 102 from the portion 66. The slides 44 corresponding to the significant orders of the amount to be accumulated bring now the corresponding typewheels 42 to print said amount on the platen 47, while the slides 44 at left of the highest significant order of the amount are arrested by the bent edge 114 through the projections 116. The slide 97 in turn is arrested by the pin 104, whereby the decimal point is not printed.

During the return stroke of the racks 8, the cam 60, through the lever 57, restores both the universal bars 80 and 49. The universal bar 80 restores thus the levers 71, whereas the projection 84 of the lever 81 restores the plate 87 and disengages its toothed edge 92 from the toothed edge 93 of the slide 36. The universal bar 49 in turn restores the slides 44 and 102, whereas the spring 64 causes the portion 66 of the bail 63 to return on the path of the projections 67. Finally, the lever 25 (FIG. 3) is caused to release the pinion 24, whereby the spring 18 restores rightwards the carriage 1 together with the slide 29 and the plate 87, while the spring 112 restores the slide 108.

In the case a total is to be taken from the totalizer 9, the carriage 1 is located in the position of FIG. 3 and the control member 45 is located in the position of FIG. 2, whereas the sectors 5 are variably rocked according to the previously set up amount which has been already accumulated in the totalizer. The sector 37 in turn engages the toothed edge 39 of the slide 29 in a position corresponding to the number of orders of the set up amount. At the depression of a total key not shown in the drawings a cycle of the shaft 7 is started, the hub 50 remaining stationary. At the beginning of this cycle the totalizer 9 (FIG. 2) is engaged with the racks 8. Then the universal bar 10 releases the racks 8, while the universal bar 80 (FIG. 1) releases the levers 71. Each rack 8 is now differentially moved rearwards by the projection 76 of the corresponding lever 71 under the action of the spring 79, until the corresponding totalizer wheel is zeroized in a known manner. The levers 71 through the racks 69 rotate the typewheels 42 according to the total taken, while the universal bar 49 releases the slides 44 and 102 which are arrested by the portion 66 of the bail 63. Simultaneously the universal bar 6 (FIG. 2) is caused to zeroize the sectors 5 of the carriage 1, while the sector 37 is disengaged from the toothed edge 39 and is suddenly moved by the spring 40 (FIG. 3) to contact the projection 41.

Substantially when the universal bar 80 (FIG. 1) has been displaced clockwise according to one step of the racks 8, the projections 91 of the rocked levers 71 are located on the path of the plate 87. Then the projection 84 of the lever 81 releases the plate 87, which thus simultaneously senses all the levers 71 and is temporarily arrested by the projections 91 of the rocked levers 71. Now the cam 32 of the shaft 7 through the lever 34 causes the link 34 to be displaced forwards, whereby the lever 31 is rocked counterclockwise and engages the clutch 30. This latter moves thus the carriage 1 leftwards together with the slides 29 and 108 and the plate 87, whereas the sector 37 is arrested by the lug 40' of the slide 36. When the plate 87 leaves the projection 91 of the lever 71 corresponding to the highest significant order of the total to be taken, it is rocked counterclockwise by the spring 86 and engages its toothed edge 92 with the toothed edge 93 of the slide 36. The plates 87 move now the slide 36 leftwards and through the bail 35 returns the lever 31 clockwise disengaging thus the clutch 30. The carriage 1 has been thus aligned according to the highest significant order of the total to be taken, while the slide 29 has moved the slide 108 leftwards to locate the bent edge 114 at left of a corresponding number of slides 44. Then the slides 44 and 112 are released from the transverse part 66 in the above described manner.

Thereafter the cam 17 of the shaft 7, through the bail 15, the slide 14 and the arm 12, engages the sectors 5 with the racks 8, whereby during the return stroke of the racks 8 the total is back transferred into the sectors 5. Furthermore, the sector 37 is caused to engage again the toothed edge 39 of the slide 29 in the reached position which corresponds to the number of orders of said total. Finally the sectors 5 are disengaged from the racks 8 and the carriage 1 is returned rightwards to the position of FIG. 3, together with the slides 29 and 108 and with the plate 87.

It is thus clear that the clutch 30 moves the slide 108

and the sensing plate 87 from right to left before the typewheels 42 are caused to print, and that the sensing plate 87 is adapted to simultaneously sense the projections 91 connected to the actuators 8 perpendicular to the transverse direction and to disengage the clutch 30 when all the sensed actuators are in the zero position to condition the slide 108 for preventing the typewheels 42 at left of the highest significant order of the amount from printing zeros.

Assuming now that before rocking the bail 63, the slide 97 is displaced leftwards from the position of FIG. 3 to locate the projection 96 between two predetermined adjacent typewheels 42. The lug 99 of the slide 97 is now displaced at left of the pin 104, which will no more prevent the projection 96 from printing the decimal point. In turn the shoulder 106 of the slide 97 engages the projection 107 of the slide 108, which is accordingly displaced leftwards irrespective of the slide 29, to bring the bent edge 114 at left of the projection 96.

Therefore, if the number of the significant orders of the amount to be printed is more than the number of orders at right of the decimal point, the pin 113 of the slide 29 additionally displaces the slide 108 leftwards and causes the amount to be printed with the proper decimal point. On the contrary, if the number of significant orders of the amount to be printed is less than the number of orders at right of the decimal point, the slide 108 remains in the position determined by the slide 97 and causes the amount to be printed according to the practice, with a corresponding number of zeroes between the highest significant digit and the decimal point.

It is thus clear that a pair of elements 106 and 113, one of which is connected to the decimal point printing member 97, and the other is connected to the sensing member 87, are adapted to move the slide 108 leftwards, whereby the slide 108 will prevent the typecarriers at left of both the highest significant order of the amount and the decimal point from printing zeros.

It is intended that modification, improvements and addition of parts may be made to the described device without departing from the scope thereof. For example a conventional non print control member may prevent the lever 57 (FIG. 1) from being rocked counterclockwise, whereby on one hand the bail 63 is not rocked counterclockwise, on the other hand, due to the shorter projection 77 of the arm 73, each rack 8 may be displaced rearwards, while the corresponding lever 71, rack 69 and typewheel 42 are not moved.

What I claim is:

1. In a calculating machine having a set of actuators differentially movable from a zero position to represent a multiorder amount, a set of typecarriers presettable by said actuators according to said amount, and means for causing said typecarriers to print, a zero printing control device comprising in combination:

- (a) a common member for preventing said typecarriers from printing,
- (b) a sensing member connected to said common member for concomitant movement in the transverse direction,
- (c) moving means adapted to move said common member and said sensing member from right to left before said typecarriers are caused to print,
- (d) means for causing said sensing member to simultaneously sense said actuators perpendicularly to said transverse direction,
- (e) and means for disabling said moving means when all the actuators sensed by said sensing member are in said zero position to condition said common member for preventing the typecarriers at left of the highest significant order of said amount from printing zeros.

2. In a calculating machine having a set of actuators differentially movable from a zero position to represent a multiorder amount, a set of typecarriers presettable by

said actuators according to said amount, and means for causing said typecarriers to print, a zero printing control device comprising in combination:

- (a) a common member for preventing said typecarriers from printing,
- (b) a sensing member connected to said common member for concomitant movement in the transverse direction,
- (c) moving means adapted to move said common member and said sensing member from right to left before said typecarriers are caused to print,
- (d) means for causing said sensing member to simultaneously sense said actuators perpendicularly to said transverse direction,
- (e) an element connected to each actuator and adapted to arrest the sensing movement of said sensing member when the connected actuator has been moved from said zero position,
- (f) and means operable by said sensing member when said sensing movement is no more arrested for disabling said moving means to condition said common member for preventing the typecarriers at left of the highest significant order of said amount from printing zeroes.

3. In a calculating machine having a set of actuators differentially movable from a zero position to represent a multiorder amount, a set of typecarriers presettable by said actuators according to said amount, and means for causing said typecarriers to print, a zero printing control device comprising in combination:

- (a) a common member for preventing said typecarriers from printing,
- (b) a sensing member connected to said common member for concomitant movement in the transverse direction,
- (c) moving means adapted to move said common member and said sensing member from right to left before said typecarriers are caused to print,
- (d) a universal bar for controlling the movement of said actuators,
- (e) means for causing said sensing member to simultaneously sense said actuators perpendicularly to transverse direction after said universal bar has been moved one step of said actuators,
- (f) an element connected to each actuator and adapted to arrest the sensing movement of said sensing member when the connected actuator has been moved from said zero position,
- (g) and means operable by said sensing member when said sensing movement is no more arrested for disabling said moving means to condition said common member for preventing the typecarriers at left of the highest significant order of said amount from printing zeroes.

4. In a ten key calculating machine having a transversely movable set up mechanism, a set of actuators differentially movable from a zero position to represent a multiorder amount, a set of typecarriers presettable by said actuators according to said amount, and means for causing said typecarriers to print, a zero printing control device comprising in combination:

- (a) a common member for preventing said typecarriers from printing,
- (b) a sensing member for simultaneously sensing said actuators,
- (c) means connecting said sensing member to said mechanism and to said common member for concomitant movement in the transverse direction,
- (d) moving means adapted to move said mechanism from right to left before said typecarriers are caused to print,
- (e) and means for disabling said moving means when all the actuators sensed by said sensing member are in said zero position to condition said mechanism for

being aligned according to the highest significant order of said amount and said common member for preventing the typecarriers at left of said highest order from printing zeros.

5. In a ten key calculating machine having a set up mechanism transversely movable from a right position, a set of actuators differentially movable from a zero position to represent an amount, a set of typecarriers presettable by said actuators according to said amount, and means for causing said typecarriers to print, a zero printing control device comprising in combination:

- (a) a common member for preventing said typecarriers from printing,
- (b) a sensing member for simultaneously sensing said actuators,
- (c) means connecting said sensing member to said mechanism and to said common member for concomitant movement in the transverse direction,
- (d) moving means adapted to move said mechanism from right to left before said typecarriers are caused to print,
- (e) a control member effective when said mechanism is in said right position for conditioning said moving means for operation,
- (f) means for disabling said moving means when all the actuators sensed by said sensing member are in said zero position to condition said mechanism for being aligned according to the highest significant order of said amount and said common member for preventing the typecarriers at left of said highest order from printing zeros,
- (g) and means for causing said actuators to back transfer said amount into said aligned mechanism.

6. In a ten key calculating machine having a totalizer, a set up mechanism transversely movable from a right position and comprising in each order a variably settable element, a set of actuators differentially movable from a zero position for taking a total from said totalizer, a set of typecarriers presettable by said actuators according to said total, and means for causing said typecarriers to print, a zero printing control device comprising in combination:

- (a) a common member for preventing said typecarriers from printing,
- (b) a sensing member for simultaneously sensing said actuators,
- (c) means connecting said sensing member to said mechanism and to said common member for concomitant movement in the transverse direction,
- (d) moving means adapted to move said mechanism from right to left before said typecarriers are caused to print,
- (e) a control member for conditioning said moving means for operation,
- (f) means for causing said sensing member to sense said actuators during the operation of said moving means,
- (g) means for disabling said moving means when all the actuators sensed by said sensing member are in said zero position to condition said mechanism for aligning said elements with the significant orders of said total and said common member for preventing the typecarriers at left of the highest order of said total from printing zeros,
- (h) and means for causing said actuators to engage said elements to back transfer said total into said elements.

7. In a ten key calculating machine having a set up mechanism transversely movable from a right position, a set of actuators differentially movable from a zero position to represent an amount, a set of typecarriers presettable by said actuators according to the represented amount, and means for causing said typecarriers to print, a zero printing control device comprising in combination:

- (a) a common member for preventing said typecarriers from printing,
 - (b) a sensing member for simultaneously sensing said actuators,
 - (c) means connecting said sensing member to said mechanism and to said common member for concomitant movement in the transverse direction,
 - (d) moving means adapted to move said mechanism from right to left before said typecarriers are caused to print,
 - (e) a set of elements on said mechanism, each element of said set being variably settable according to an order of a set up amount,
 - (f) a member settable according to the number of orders of said set up amount,
 - (g) means for returning said mechanism to said right position after said set-up amount has been accumulated into a totalizer,
 - (h) a control member effective when said mechanism is in said right position for conditioning said moving means for operation,
 - (i) means for disabling said moving means when all the actuators sensed by said sensing member are in said zero position to condition said mechanism for aligning said elements with the significant orders of said represented amount and said common member for preventing the typecarriers at left of the highest order of said represented amount from printing zeros,
 - (j) means effective at the beginning of a total taking operation for zeroizing said elements,
 - (k) means for causing then said actuators to engage said elements to back transfer said represented amount into said elements,
 - (l) and means controlled by said sensing member for setting said settable member according to the number of orders of said represented amount.
8. In a calculating machine having a set of actuators differentially movable from a zero position to represent a multi-order amount, a set of typecarriers presettable by said actuators according to said amount, and means

for causing said typecarriers to print, a zero printing control device comprising in combination:

- (a) a common member for preventing said typecarriers from printing,
- (b) a printing member transversely settable between two predetermined adjacent typecarriers of said set for printing a decimal point between the corresponding two orders of said amount,
- (c) a sensing member adapted to be moved in the transverse direction,
- (d) moving means adapted to move said sensing member from right to left before said typecarriers are caused to print,
- (e) means for causing said sensing member to simultaneously sense said actuators perpendicularly to said transverse direction,
- (f) means for disabling said moving means when all the actuators sensed by said sensing member are in said zero position,
- (g) and a pair of elements adapted to move said common member leftwards, one of said elements being connected to said printing member, the other element being connected to said sensing member, whereby said common member will prevent the typecarriers at left of both the highest significant order of said amount and said printing member from printing zeros.

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LOUIS J. CAPOZI, *Primary Examiner.*