

[72] Inventor **Michael W. Grey**
Azusa, Calif.
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 [73] Assignee **Addmaster Corporation**
San Gabriel, Calif.

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Primary Examiner—Richard B. Wilkinson

Assistant Examiner—Stanley A. Wal

Attorney—Fred N. Schwend

[54] **CHECKWRITER**
 12 Claims, 10 Drawing Figs.

[52] U.S. Cl. 235/58

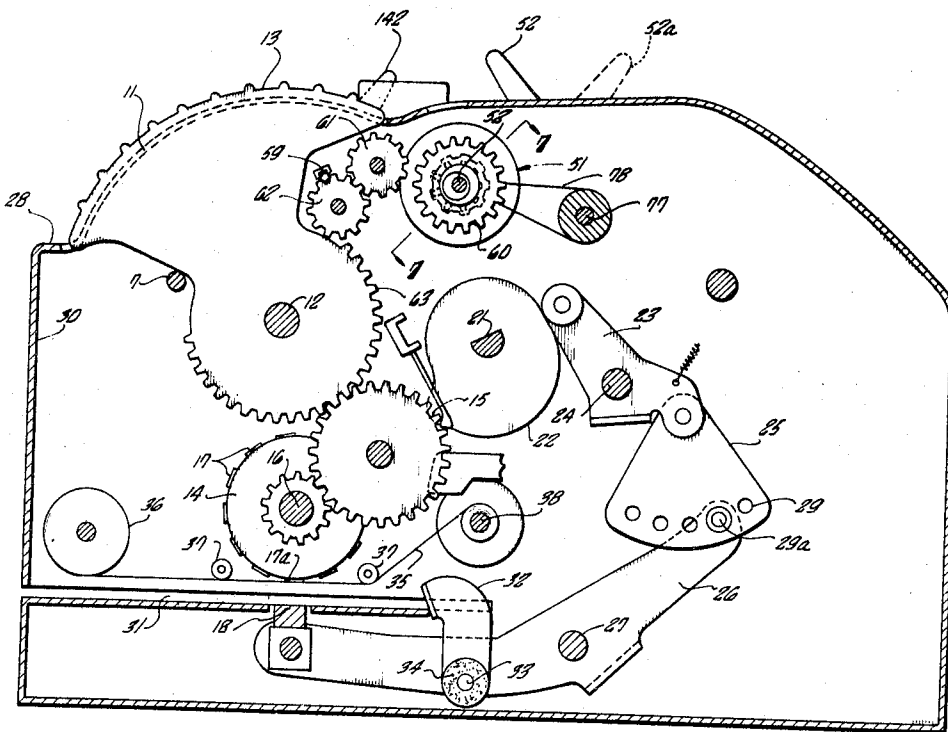
[51] Int. Cl. G06c 29/00,
 G06k 15/06

[50] Field of Search 235/58
 (CWHM), 58 (GEN), 58 (PRINT), 101

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ABSTRACT: A checkwriter incorporating an accumulator and differentially settable sectors for entering amounts to be printed on checks and for subtracting such amounts from the accumulator as well as for adding into the accumulator amounts representing deposits in the user's bank account. The checkwriter is automatically locked up when an amount is overdrawn from the accumulator or when an amount greater than a predetermined amount is entered. The checkwriter also incorporates control means which are normally set to cause subtract operations but which may be selectively set to cause an add operation and which are automatically returned to subtract controlling condition following an add operation.



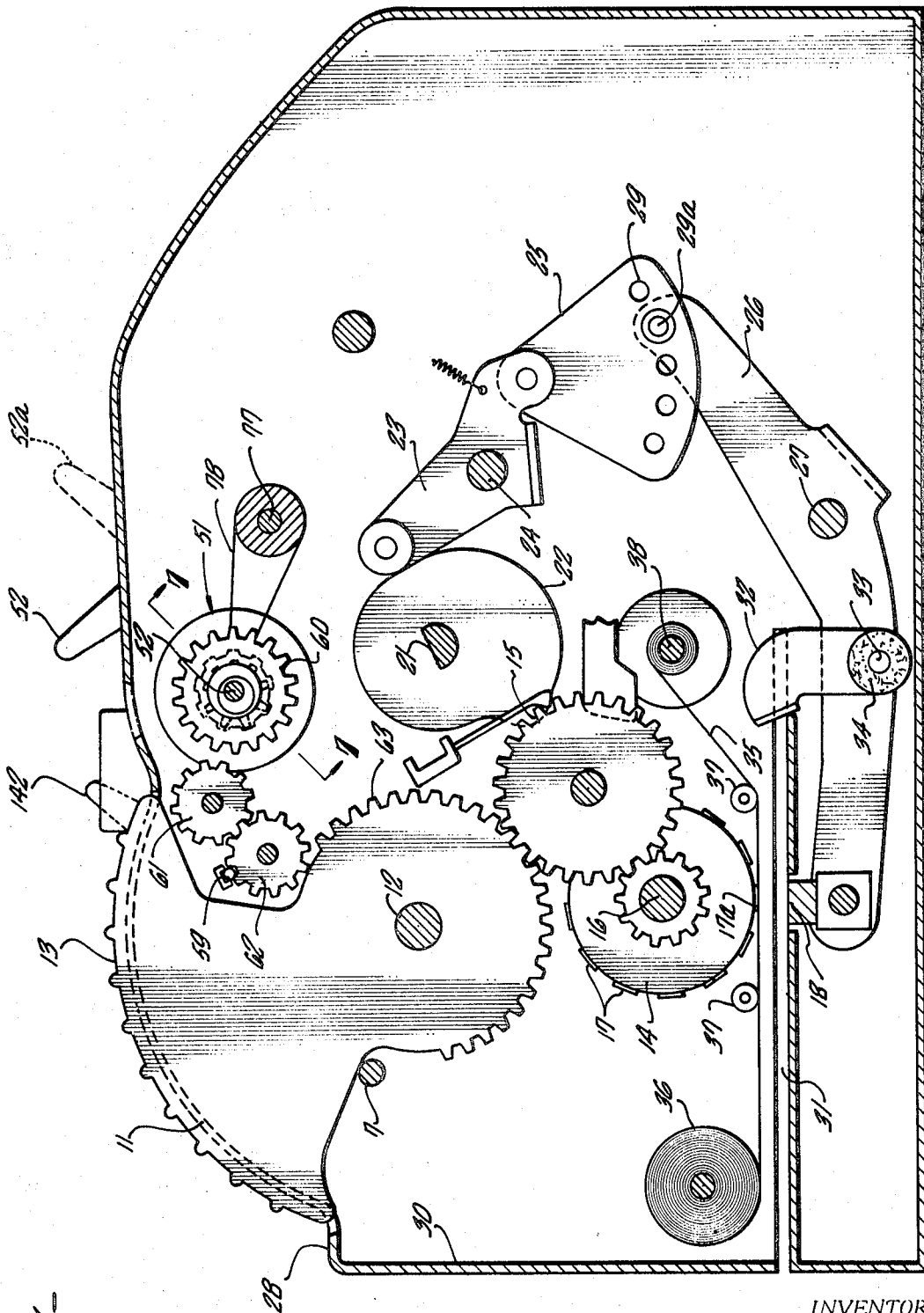


FIG. 1

INVENTOR.

MICHAEL W. GREY

BY

Paul W. Schward

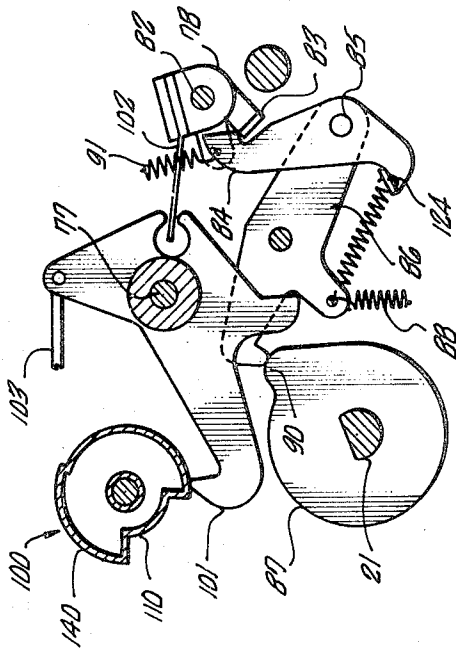


FIG. 1

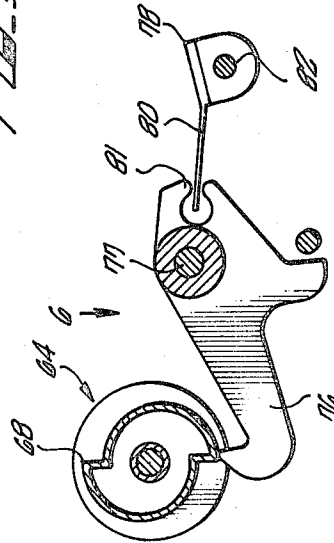
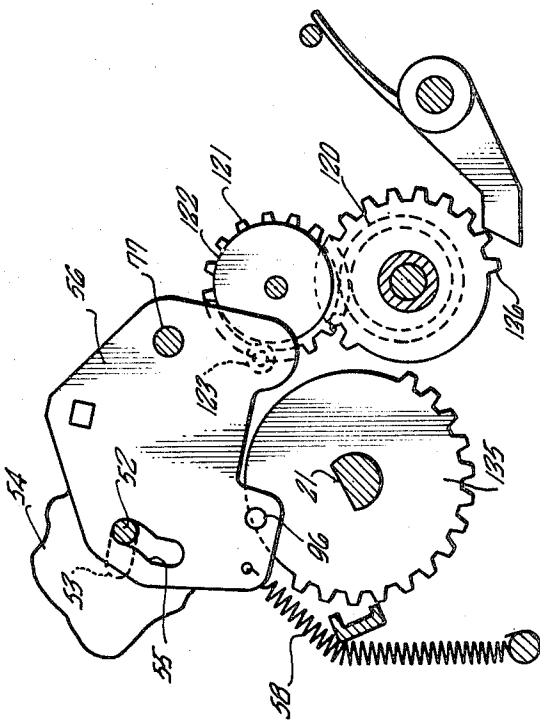
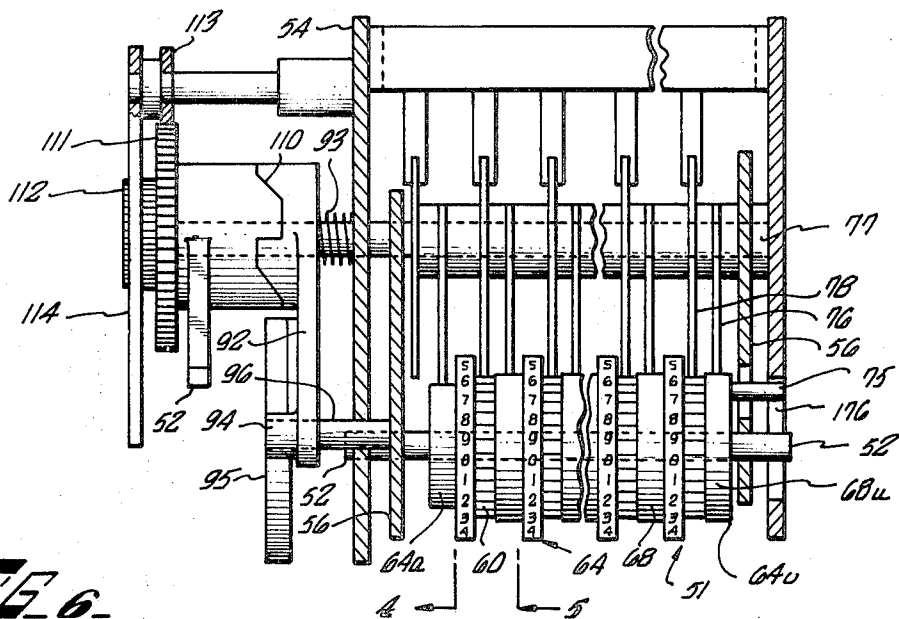
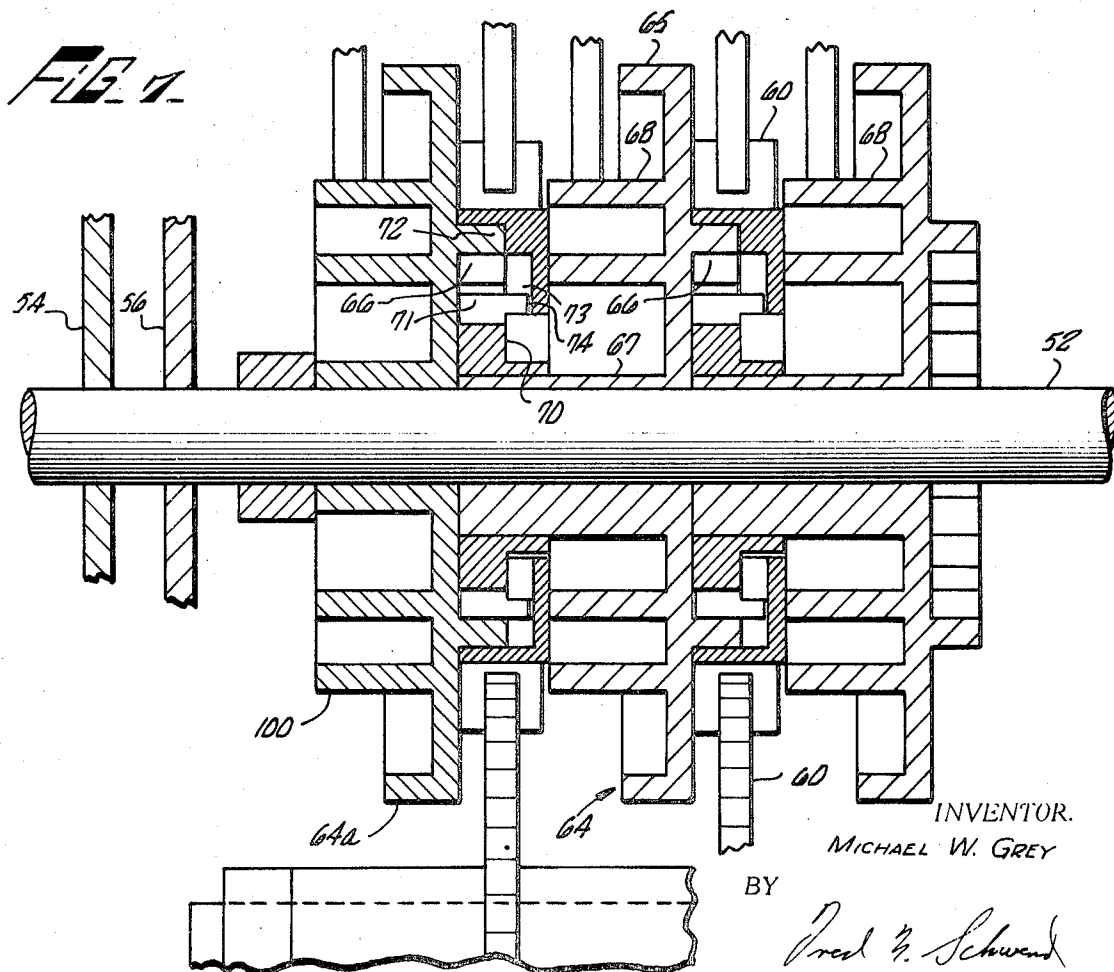


FIG. 2





INVENTOR.
MICHAEL W. GREY

BY

Fred W. Schwend

FIG. 8

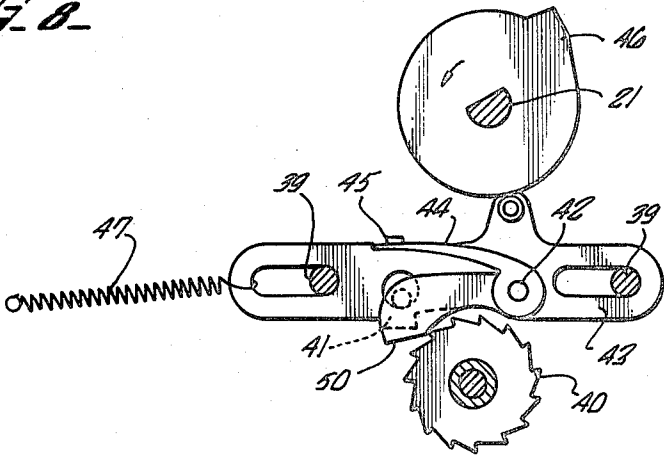


FIG. 9

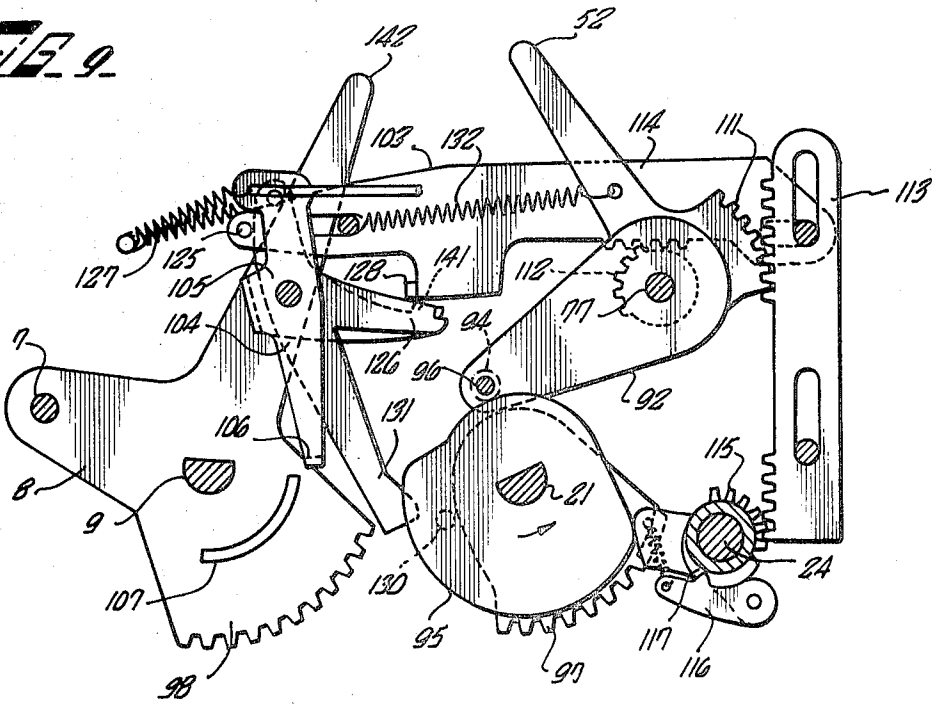
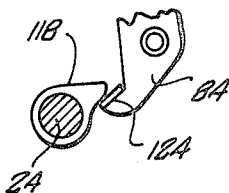


FIG. 10



INVENTOR.
MICHAEL W. GREY
BY
John W. Schwend

CHECKWRITER

This invention relates to checkwriters and has particular reference to checkwriters of the type which keep track of the user's bank balance at all times.

In preparing checks payable against a maker's bank account, it is the custom for the maker to keep track of his bank account balance and to subtract the amount of each check from the previous balance so that the current balance is always known. This enables him to continually check the bank's records against his own and to apprise him of when a deposit should be made so that sufficient amounts will be maintained in his account. However, there is always a danger of the check maker making errors in deducting the amount of checks made, in adding amounts deposited, or in forgetting to make deductions, resulting in the possibility of embarrassment to himself and additional expense and trouble for the bank in its bookkeeping procedure.

Heretofore, checkwriters have been proposed which incorporate accumulators from which amounts printed on checks are deducted, the amount registered by the accumulator representing the user's bank balance. However, such checkwriters of which applicant is aware are either complicated and therefore expensive or require time consuming and laborious manipulation which render them undesirable.

It therefore becomes a principal object of the present invention to provide a checkwriter incorporating a balance indicating register or accumulator which is relatively simple and easy to operate.

Another object is to provide a checkwriter which operates to apprise the user when his bank balance is either overdrawn or is beyond a predetermined amount.

Another object is to provide a checkwriter which is readily settable to enter or withdraw amounts therefrom.

Another object is to provide a checkwriter incorporating an accumulator and which is normally set in subtract condition and which will be automatically returned to subtract condition following addition of an amount representing a deposit of an amount into the user's bank account.

The manner in which the above and other objects of the invention are accomplished will be readily understood on reference to the following specification when read in conjunction with the accompanying drawings, wherein:

FIG. 1 is a longitudinal sectional view through a checkwriter and bank balance indicator embodying a preferred form of the present invention.

FIG. 2 is a sectional view illustrating part of the accumulator positioning mechanism.

FIG. 3 is a view illustrating the cyclic clutch and controls therefor.

FIG. 4 is a sectional view illustrating part of the accumulator mechanism is taken substantially along line 4-4 of FIG. 6.

FIG. 5 is a sectional view through another portion of the accumulator and is taken substantially along line 5-5 of FIG. 6.

FIG. 6 is a plan view, partly in section, taken substantially in the direction of the arrow 6 of FIG. 5.

FIG. 7 is a sectional view through the accumulator and is taken substantially along line 7-7 of FIG. 1.

FIG. 8 is a sectional view illustrating the ribbon feed mechanism.

FIG. 9 is a sectional view illustrating part of the checkwriter controls.

FIG. 10 is a fragmentary sectional view showing a part of the accumulator positioning controls.

CHECK IMPRINTER

Referring to the drawings, the checkwriter comprises a plurality of denominationally arranged sectors 11 independently pivoted on a rock shaft 12 and each having a series of numbered finger spaces 13 arranged around a portion of the periphery thereof. The sectors 11 are normally located in their positions shown in FIG. 1 and are each entrained with a respective type wheel 14 through a pinion 15, the latter mesh-

ing with a gear 19 integral with the type wheel. The type wheels are independently rotatable on a stationary shaft 16 and have a series of spaced type characters 17 therearound ranging in value from zero to nine, in addition to an asterisk type character 17a. Normally, when the sectors 11 are in their illustrate home positions, such asterisk characters are located directly above a rubber platen 18 which extends across all of the type wheels. Normally, a bail rod 7 (FIGS. 1 and 9) carried by sectors 8 fixed to a rock shaft 9 is yieldably urged into engagement with the sectors 11 by a relatively light spring (not shown).

The checkwriter is operated by a motor (not shown) through a cyclically operable clutch generally indicated at 200 (FIG. 3). The latter comprises a motor driven ratchet wheel 201 rotatably mounted on a main drive shaft 21 to which is attached a clutch disc 202. A clutch pawl 203 pivotally supported by the clutch disc and spring urged in a counterclockwise direction is normally held out of engagement with the ratchet wheel 201 by a clutch dog 204. The latter is pivotally supported at 205 and connected to a depressible motor bar 206 through a lever 207 fulcrumed at 208.

The main drive shaft 21 carries printer cams, one of which is shown at 22. Each cam operates against a cam follower 23 pivoted at 24 and connected by a link 25 to a bail 26. The latter is fulcrumed at 27 and carries the platen 18.

In operating the checkwriter to imprint a check, the user places his finger in numbered finger space 13 of a sector 11 representing a digit to be printed and then rotates the sector counterclockwise until his finger strikes a ledge 28 in a machine cove 30, thereby displacing the bail rod 7 and causing the respective type wheel 14 to present a correspondingly valued type character opposite the printing platen 18. When the appropriate sectors have been set, a blank check (not shown) is inserted in slots 31 in the cover 30 until it arrests against an adjustable stop comprising a bail 32 fulcrumed at 33 and provided with friction discs 34 which frictionally engage the sides of the cover 30 to hold the same in any adjusted position. The motor bar 206 is then depressed to effect a cycle of operation of the clutch 200, causing the cams 18 to raise the platen 18 to transfer an imprint from aligned type characters on the printwheels 14, through a printing ribbon 35, and onto the check. For the purpose of varying the amount of printing impression, each link 25 has a series of holes 29 therein, each located at a slightly different distance from the point of pivotal connection with the follower 23. A stud 29a on the bail 26 may be inserted into any of the holes 29 to form a pivotal connection between the link and bail 26.

PRINTING RIBBON

The printing ribbon 35 is supplied from a supply roll 36 and is led under guide rollers 37 and onto a takeup roll 38.

Means are provided to incrementally advance the printing ribbon as an incident to each imprinting operation and for this purpose a ratchet wheel 40 (FIG. 8) is integrally attached to the takeup roll 38 and cooperates with a pawl 41 pivotally supported at 42 on an actuating slide 43 and yieldably pressed into a position to engage the ratchet wheel by a spring tail 44 thereon which engages an ear 45 on the slide 43. The slide 44 is slidably supported for fore and aft movement by pin and slot supports 39, and during each revolution of the shaft 21, shouldered cam 46 drives the slide 43 rearwardly against the action of a tension spring 47, causing the pawl 41 to incrementally advance the ratchet wheel 40 and thereby the printing ribbon 35. As the takeup roll 38 builds up in diameter, it will engage a sensing finger 50 formed integral with the pawl 41 and thereby rocks the pawl clockwise until it misses the ratchet wheel 40 during reciprocation of the slide 43, thereby requiring that the printing ribbon be rewound on the supply roll or be replaced.

ACCUMULATOR

For the purpose of indicating at all times the balance of the user's bank account, an accumulator generally indicated at 51

is provided. The accumulator is of the crawl type basically similar to that disclosed in the patent to R. E. Busch, U.S. Pat. No. 3,113,719 issued on Dec. 10, 1963. The accumulator is normally controlled to subtract an amount set up on the sectors 11 from a total registered thereby. However, upon setting of a control lever 52 from its full line position shown in FIGS. 1 and 9 to its dotted line position 52a, an amount set up in the sectors and representing an amount deposited into the user's bank account will be added into the accumulator.

Referring in particular to FIGS. 1, 2, and 4 to 9, the accumulator 51 comprises an accumulator shaft 52 guided for fore-and-aft transverse movement in guide slots 53 formed in side frame plates 54. The shaft 52 also extends through curved slots 55 formed in side plates 56 of an accumulator control frame, the latter being pivotally supported on a stationary rod 77 and normally held in its position shown in FIG. 2 by tension springs 58. The slots 55 are so formed as to normally hold accumulator gears 60 out of mesh with aligned drive pinions 61 (as shown in FIG. 1), the latter being entrained with similar pinions 62 located in the path of gear sections 63 formed on the sectors 11.

Each denominational order of the accumulator, except the leftmost one, comprises a dial element 64 forming a dial 65 on which two series of numerals are marked therearound, each series ranging progressively from 0 to 9. Also integral with each dial element is a set of twenty internal gear teeth 66, an eccentric hub 67, and a double snail cam 68 (see also FIG. 5).

A floating gear 70 having eighteen gear teeth 71 thereon is rotatably mounted on a respective eccentric hub 67 and meshes with the teeth 66 of the associated dial element.

Each accumulator gear 60 is rotatably mounted on an annular flange 72 on the associated dial element 64 and has nine gear teeth elements 73 thereon which mesh with nine gear teeth elements 74 on the floating gear. Thus, it will be seen from the above that each accumulator gear 60 is entrained in a 9 to 10 ratio with its associated dial element 64 through a floating gear 70. Accordingly, each dial element receives rotation from both its associated accumulator gear 60 and the dial element in the next lower denominational order. The relationship between the gears is such that each dial element will receive one digital increment of movement from its associated accumulator gear upon movement of the latter one digital increment and it will receive one-tenth of a digital increment upon movement of the dial element in the next lower denominational order one digital increment so that tens carry may be effected simultaneously with digitation in either of opposite directions, depending upon whether additive or subtractive entries are being made.

It will be noted that the dial element 64u in the units or lowest denominational order has been modified by removing the dial and such dial element is prevented from rotating in either direction. For this purpose, the dial element 64u is provided with a stud 75 which is embraced by a slot 176 in the side frame plate 54. The slot 176 extends in a direction in line with the axis of the pinions 61 so as to prevent rotation of the dial element during meshing and demeshing of the accumulator. Also, a concentric hub may be substituted for the units order snail cam 68u.

In order to align the dial elements 64 along a horizontal reading line, regardless of any partial tens transfer increments transferred thereto from lower orders, each snail cam 68 controls an associated cam follower 78 pivoted on the rod 77 and formed integral with a gear sector 178 arranged to mesh with the accumulator gear 60 in the next higher order.

The cam followers 76 are normally held out of engagement with the respective snail cams 68 during digitation of the accumulator gears 60 and are moved into engagement toward the end of a cycle. For this purpose, the cam followers 76 are provided with jaws 81 which embrace the free ends of leaf springs 80 carried by a bail 78 fulcrumed on a stationary rod 82. The bail has an ear 83 normally engaged by a hook member 84 pivoted at 85 on a cam follower 86. The latter is held in engagement with a cam 87 on the drive shaft 21 by a tension

spring 88. When the machine is in its full cycle position illustrated in FIG. 4, a lobe 90 on cam 87 holds the cam follower 86 in a position to maintain the bail 78 in its clockwise rocked position wherein it stresses the leaf springs 80 urge the cam followers 76 against respective ones of the snail cams 68 and thus hold the various dials of the accumulator in positions wherein the numerals thereon are located on a common reading line. Shortly after the start of a cycle, the cam lobe 90 passes from under the cam followers 86, permitting a relatively heavy tension spring 91 to rock the bail 78 clockwise and thus cause the leaf springs 80 to retract the cam followers 76 from engagement with their respective snail cam.

ACCUMULATOR CONTROLS

As noted heretofore, the accumulator is normally conditioned to enable items set up in the sectors 11 to be subtracted therefrom and for this purpose, a cam follower arm 92 (FIGS. 6 and 9) is slideably and rotatably mounted on the rod 77 and is normally held by a compression spring 93 in a position wherein a boss 94 thereon lies directly over a subtract cam 95.

The lefthand accumulator control plate 56 carries a pin 96 (FIGS. 2, 6, and 9) which extends into a bearing hole in the arm 92. Accordingly, after approximately 90° of a machine cycle, cam 95 will rock the arm 92 and therefore the accumulator control frame plates 56 clockwise to mesh the accumulator gears 60 with the pinions 61. Shortly thereafter, gear sectors 97 on shaft 21 mesh with gear sections 98 on the sectors 8 to thereby cause the bail rod 7 to return the sectors 11 to their home positions and at the same time to digitize the accumulator gears 60. As the gear sections 63 become demeshed from the pinions 62, the latter are arrested by a spring detent device 59.

Toward the end of a machine cycle, cam 95 permits springs 58 to return the accumulator control frame including plates 56 downwardly to demesh the accumulator.

Means are provided to prevent entry of an item into the sectors 11 when the accumulator has become negatively overdrafted and for this purpose the dial element 64a located in the lefthand or highest denominational order of the accumulator, i.e., one order to the left of the order containing the leftmost sector 11, is modified to provide a three-level stop hub 100 (see also FIG. 4) in lieu of a snail cam 68. The hub 100 controls a sensor lever 101 pivoted on the rod 77 and adapted to be pressed against the hub by a leaf spring 102 carried by the bail 78 in the same manner that the springs 80 press the cam followers 76 into engagement with the snail cams 68.

The lever 101 is connected by a link 103 (see also FIG. 9) to a blocking lever 104 pivoted at 105 and provided with an ear 106 which is normally held out of blocking engagement with an arcuate boss 107 formed on one of the sectors 8.

When an amount greater than that registered by the accumulator is subtracted therefrom, the accumulator becomes negatively overdrafted and in this condition the highest order dial element 64a moves from 0 to 9 registration and presents the lowermost level section 110 of its hub 100 to the sensing nose of the lever 101. Thus, toward the end of the cycle the lever 101 and, correspondingly, the lever 104 is rocked clockwise sufficiently to place the ear 106 in blocking relation to the boss 107, thereby preventing setting of the sectors 11 so as to apprise the user of the fact that his bank account has been depleted and requiring that an amount representing that deposited in his account be additively entered into the accumulator in order to unblock the sectors.

In order to clear an amount erroneously set up in the sectors 11 at any time prior to initiation of a subtract cycle, a knob 142 extending from one of the sectors 8 and projecting through an opening (not shown) in the cover 30 may be pressed rearwardly, causing the bail rod 7 to return the various sectors 11 to home positions.

As mentioned heretofore, amounts are added into the accumulator by first setting the lever 52 into its dot-dash position 52a and thereafter setting the sectors 11 and finally causing engagement of the clutch 20 to initiate a machine cycle.

As shown in FIGS. 7 and 9, the lever 52 is rotatably mounted on the rod 77 and is provided with an end cam formation 110 engageable with a similar cam formation on the arm 92. The lever also has integral therewith gear sectors 111 and 112 meshing with gear sections on slides 113 and 114, respectively. The slide 113 also meshes with a sector 115 rotatably mounted on the shaft 24 and carrying a pawl 116 engageable with a shoulder 117 on the hub of a cam 118, FIG. 10. The cam also carries a gear 120 (FIG. 2) meshing with a gear 121 carrying a cam 122. The latter engages a cam follower roller 123 carried by one of the accumulator control frame plates 56. Accordingly, upon rocking of the lever 52 to add control position, the slide 113 will rock sector 115, causing its pawl 116 to partly rotate the cam 118 clockwise which, through cam 122 and accumulator control plates 56, will directly effect meshing of the accumulator gears with the pinion 61. The cam 122 will be held in a partly rotated position by a spring detent 119 which engages a gear sector 136 integral with the cam. At the same time, the cam 118 will engage an ear 124 on the hook member 84 (FIG. 4) to release the same from the bail 78, permitting spring 91 to rock the latter clockwise and thus remove the various cam followers 76 and sensing lever 101 from the sail cams 68 and stop hub 100.

Also, during clockwise rocking of the lever 52 to condition the machine for addition, the slide 114 is moved rearward, causing a pin 125 thereon to rock the blocking lever 104 from blocking relation with the sector 8 so that an amount to be added may be set in the sectors. As the slide 114 moves into its rearmost position, a latch 126 is rocked counterclockwise by a spring 127 into latching engagement with an ear 128 on the slide to hold the checkwriter in add condition.

During the ensuing setting of the sectors 11, they will directly digitize the accumulator gears 60 through the pinions 62 and 61.

During the ensuing cycle initiated by depression of the motor bar 206, a gear sector 135 (FIG. 2) on the drive shaft 21 meshes with the sector 136 and thus advances the same, causing the cam 122 to return to its initial position, permitting the springs 58 to return the accumulator control plates 56 counterclockwise so as to demesh the accumulator. Toward the end of the cycle, a pin 130 (FIG. 9) carried by cam 95 engages a foot 131 on latch 126 to rock the same clockwise. This releases the slide 114, permitting a tension spring 132 to return the lever 52 and connected linkage back to normal subtract controlling condition.

Means are provided to prevent addition of amounts into the accumulator greater than the capacity thereof. For this purpose, the hub 100 (FIG. 4) of the highermost order dial element 64a is provided with a high level portion 140 which is presented to the sensing lever 101 when a predetermined positive amount has been registered by the accumulator. Accordingly, the lever 101, and therefore the blocking lever 104, will be held counterclockwise of their positions illustrated in FIGS. 4 and 9, when urged toward the same by spring 102, permitting an arm 141 extending from the blocking lever 104 to locate in blocking relation behind the ear 128 on slide 114, thus preventing the lever 52 from being moved rearwardly to add controlling position.

It should be noted that the arcuate boss 107 on the sector 8 enforces setting of the lever 52 to its "add" control setting prior to setting of an amount into the sectors 11. That is, setting of any of the sectors 11 to represent a digit will rock the bail rod 7 and sectors 8 counterclockwise, positioning the boss 107 in front of ear 106 on blocking lever 104, thus blocking rearward movement of the lever 52 and link 14.

Although the invention has been described in detail and certain specific terms and languages have been used, it is to be understood that the present disclosure is illustrative rather than restrictive and that changes and modifications may be

made without departing from the spirit or scope of the invention as set forth in the claims appended hereto.

I claim:

1. In a checkwriter having an accumulator; printing mechanism; means including differentially movable sectors for setting up amounts to be printed; control mechanism settable in a first condition for causing said sectors to subtract an amount from said accumulator; the combination of a member movable out of a home position by any of said sectors upon setting up an amount; and means controlled by said accumulator upon reaching an overdrafted condition for blocking said member from moving out of said home position.
2. The combination according to claim 1 comprising cyclically operable drive means wherein said last-mentioned means comprises means for sensing an overdraft condition of said accumulator; means controlled by said sensing means upon sensing an overdraft condition for blocking said member from moving out of said home position; and means responsive to said drive means when out of full cycle position for rendering said sensing means inoperative and responsive to said drive means when in full cycle position for rendering said sensing means operative.
3. The combination according to claim 1 wherein said last-mentioned means comprises sensing means for sensing an overdraft condition of said accumulator; means controlled by said sensing means upon sensing an overdraft condition for blocking said member from moving out of said home position; cyclically operable means having a full cycle position for operating said printing mechanism; and means operable during operation of said sectors for rendering said sensing means ineffective and operable substantially at the end of a cycle of said cyclically operable means for rendering said sensing means effective.
4. The combination according to claim 3 wherein said last-mentioned means maintains said sensing means operable when said cyclically operable means is in said full cycle position.
5. The combination according to claim 1 wherein said control mechanism is selectively settable in a second condition to cause said sectors to add an amount set up in said sectors into said accumulator, and means responsive to operation of said checkwriter for resetting said control mechanism in said first condition.
6. The combination according to claim 1 wherein said control mechanism is selectively settable into a second condition to cause said sectors to add an amount set up in said sectors into said accumulator; latch means for maintaining said control mechanism in said second condition; spring means for returning said control mechanism to said first condition; and means responsive to operation of said checkwriter for releasing said latch means.
7. The combination according to claim 5 comprising means controlled by said accumulator when the highermost order thereof registers a predetermined positive amount for preventing said control mechanism from being set into said second condition.
8. The combination according to claim 7 comprising means controlled by said last-mentioned means when said member is out of said home position for preventing movement of said control mechanism between said first and said second conditions.
9. In a checkwriter having an accumulator; printing mechanism; means including sectors differentially movable from home positions for setting up amounts to be printed; and cyclically operable drive means; the combination comprising:

control mechanism settable in an add condition for causing said sectors to add amounts into said accumulator during movement of said sectors away from said home positions,

said control mechanism being settable in a subtract condition for causing said drive means to drive said sectors to said home positions and for causing said sectors to subtract amounts from said accumulator during movement of said sectors to said home positions.

10. The combination according to claim 9 comprising means for sensing an overdraft condition in said accumulator; means controlled by said sensing means upon sensing an overdraft condition for preventing movement of said sectors out of said home positions; and means controlled by said control mechanism when set in

said add condition for rendering said sensing means inoperative.

11. The combination according to claim 10 comprising spring means for rendering said sensing means inoperative; means including a latch operable by said drive means for normally rendering said sensing means inoperative during the major portion of a cycle and for rendering said sensing means operative during the remainder of said cycle; and

means controlled by said control mechanism when set in said add condition for releasing said latch.

12. The combination according to claim 9 comprising means controlled by said drive means for invariably setting said control mechanism in said subtract condition.

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