

[54] CHECKWRITER

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[52] U.S. Cl. 235/58 CW
[51] Int. Cl. G06k 1/00
[58] Field of Search. 235/58 CW, 58 R, 58 P

[56] References Cited

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[57]

ABSTRACT

A checkwriter having differentially settable printing sectors for printing amounts on checks and for subtracting such amounts from an accumulator which registers the balance in s user's bank account. The sectors are also used to add amounts in the accumulator representing deposits in the user's bank account. The sectors are manually advanced to different amount representing positions from home positions wherein they locate special symbols to be printed in lieu of amounts. After printing, the sectors are returned towards their home positions and during this movement they digitize the accumulator. Overthrow preventing means momentarily arrest the sectors and accumulator at zero registration of the sectors. The accumulator is then demeshed and the sectors are further returned to home positions. Intermeshing check locating members are provided to adjust a check relative to the printing line.

8 Claims, 11 Drawing Figures

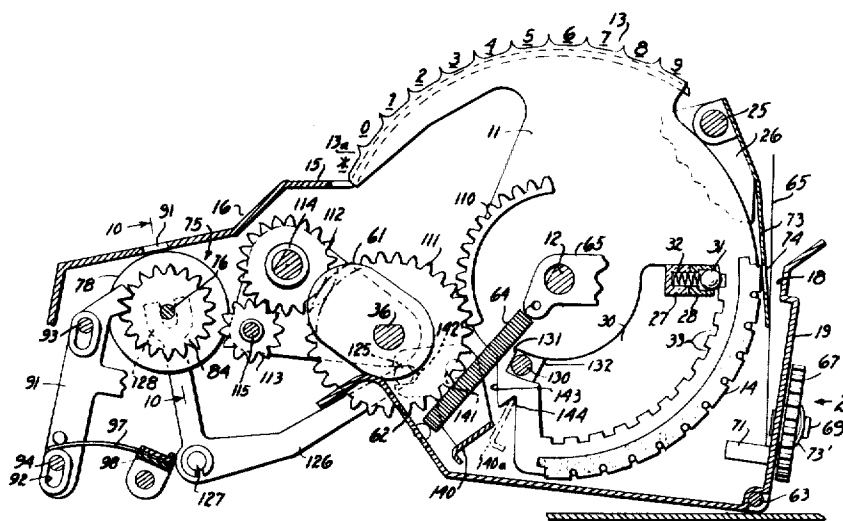




FIG. 3.

FIG. 2.

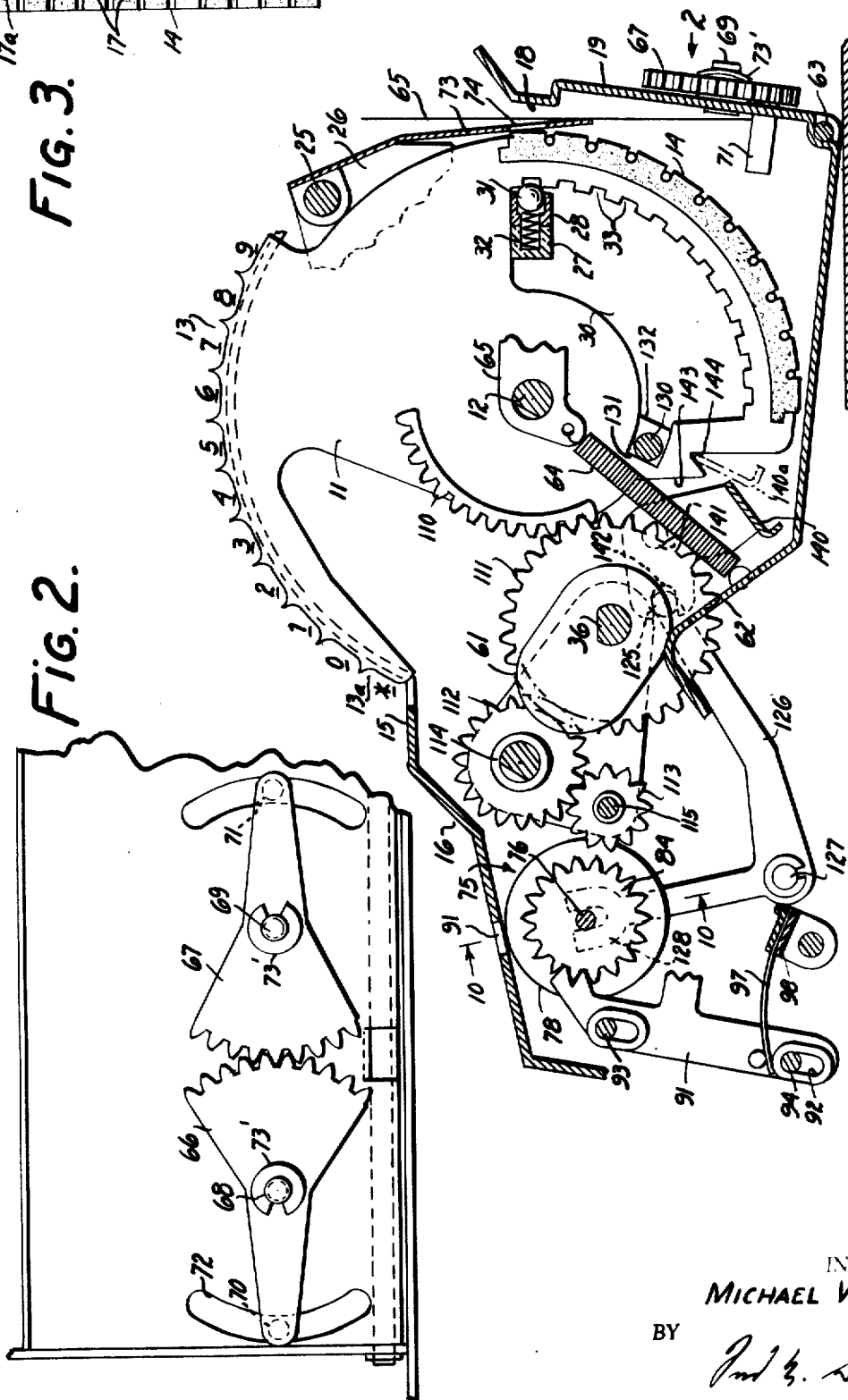
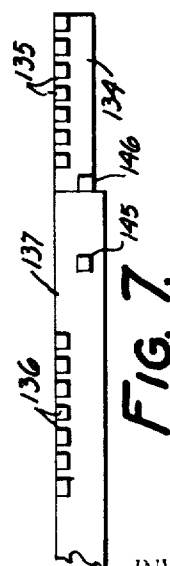
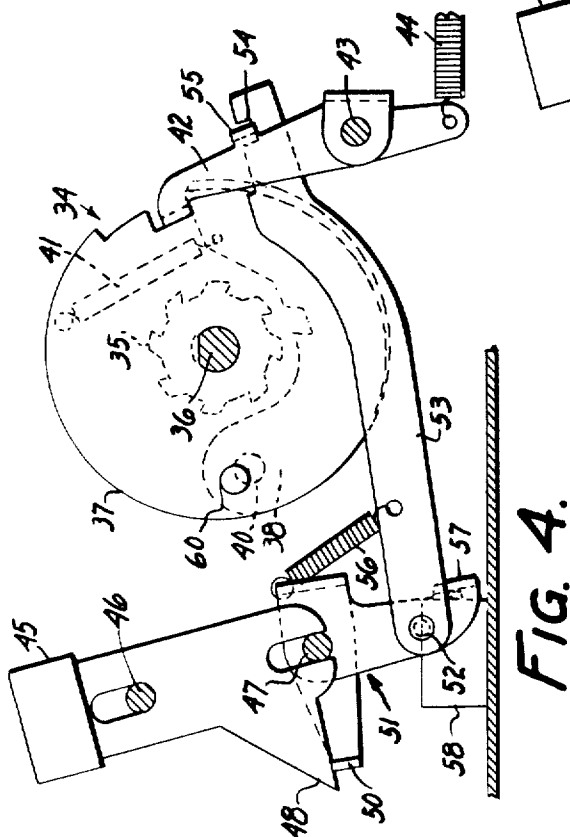
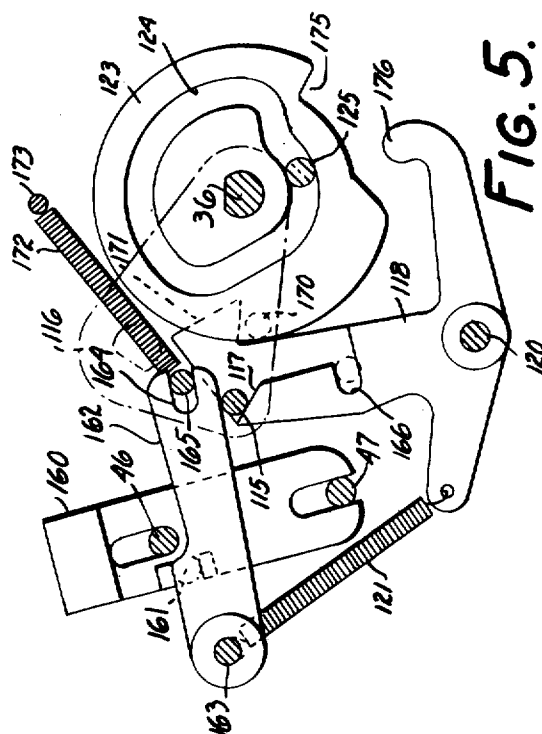
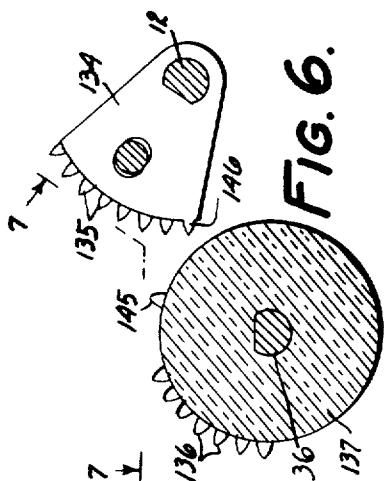


FIG. 1.

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FIG. 8.

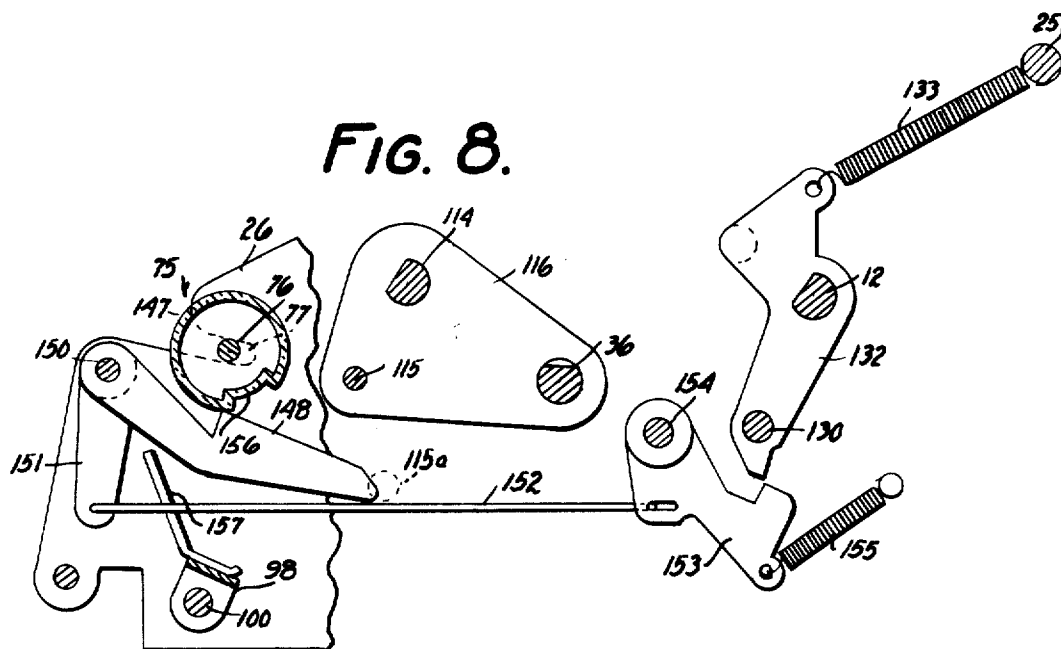


FIG. 9.

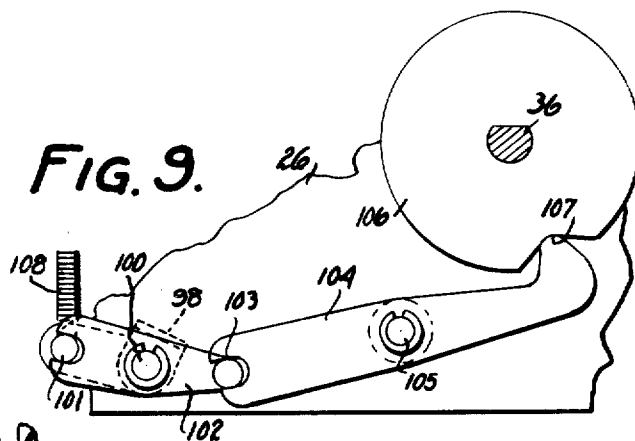


FIG. 10.

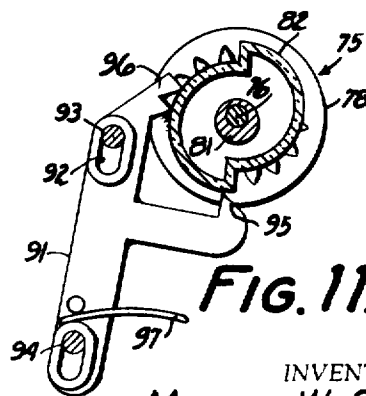
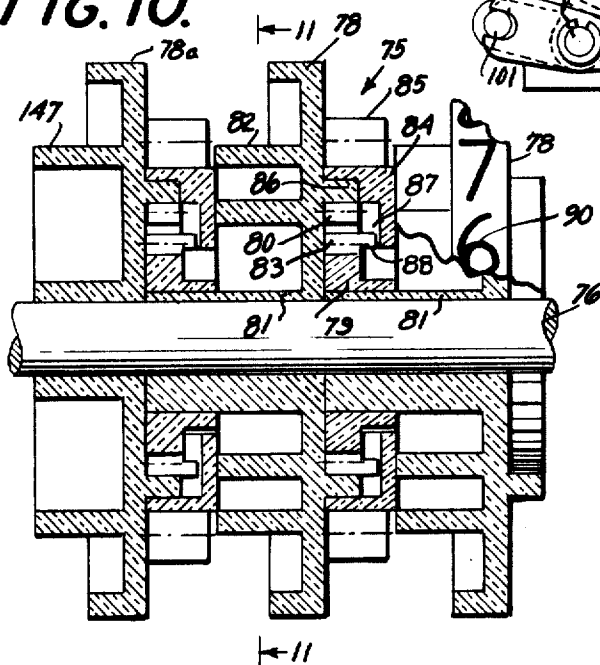


FIG. 11.

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CHECKWRITER

BACKGROUND OF THE INVENTION

1. Field of the Invention

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.

2. Description of the Prior Art

The M. W. Grey Pat. No. 3,570,756, issued on Mar. 16, 1971, is representative of a checkwriter incorporating an accumulator which automatically deducts amounts printed on checks from a total registered in the accumulator and representing the user's bank balance. Such checkwriter incorporates manually settable printing sectors having type characters ranging from a special symbol through zero, to nine. In printing checks, those sectors which are to print amounts are manually set to resist the desired amounts. Other sectors remain in home positions where they print special symbols, such as an asterisk. Printing is effected and the sectors are then returned by power while subtractively digitizing the accumulator. As the sectors reach their zero registering positions, the accumulator is disconnected and the sectors continue on to their home positions.

Although such prior checkwriter works satisfactorily at speeds below a certain critical limit, the accumulator tends to overthrow at higher speeds.

Also, in such prior checkwriter, an amount to be added to represent a deposit in the user's bank account is added directly during manual setting of the sectors. This requires a different timing of certain mechanisms of the checkwriter and thus requires additional mechanism to effect the change in timing during add operations.

SUMMARY OF THE INVENTION

According to the present invention, the printing sectors digitize the accumulator during power return of the sectors from manually set positions toward home positions, and in order to prevent overthrow of the accumulator, the sectors are positively arrested in zero registering positions, after which the accumulator is disconnected and the sectors are subsequently further power returned to home positions.

The accumulator is digitized either additively or subtractively during the power return of the printing sectors from their manually set positions so that the same basic timing of the machine is retained regardless of whether amounts are added or subtracted. Therefore, the controls for the checkwriter can be made simpler and more reliable.

A novel, simple, and highly reliable check positioning device enables the position of the printing line on a check to be changed as desired or as dictated by the format of the check.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a longitudinal sectional view taken through a checkwriter embodying a preferred form of the present invention.

FIG. 2 is a rear view taken in the direction of arrow 2 in FIG. 1, illustrating the adjustable check positioning device.

FIG. 3 is a developed view of one of the porous rubber printing segments.

FIG. 4 is a sectional side view illustrating the cyclic drive clutch and the controls therefor.

FIG. 5 is a sectional side view illustrating mainly the means including the deposit key for setting the checkwriter in an add condition.

FIG. 6 is a sectional side view illustrating part of the drive train for returning the input sectors to their home positions.

FIG. 7 is a developed view of the gears shown in FIG. 6 and is taken substantially along the line 7-7 of FIG. 6.

FIG. 8 is a sectional side view illustrating the overdrift lock mechanism for the input sectors.

FIG. 9 is a side view of part of the accumulator controls.

FIG. 10 is an enlarged sectional view through a part of the accumulator and is taken substantially along the line 10-10 of FIG. 1.

FIG. 11 is a sectional side view through the accumulator, illustrating part of the dial aligning device, and is taken along line 11-11 of FIG. 10.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, the checkwriter comprises a plurality of denominationally arranged input sectors 11 independently pivoted in side-by-side relation on a rock shaft 12. Each sector 11 has a series of numbered finger spaces 13 arranged around the periphery thereof and identified by a series of characters, including an asterisk symbol and the digits 0 to 9.

Each of the input sector 11 carries a porous ink impregnated segment 14 of rubber or the like, such as is known in the trade as "PORELON" having type characters formed in the outer face thereof as indicated at 17 in FIG. 3 and comprising an asterisk and the digits 0 to 9 corresponding to those marked on the finger spaces 13. Normally, when the sectors are in their illustrated home positions, the finger space 13a of each input sector which is marked with an asterisk or star, is located directly above a shelf 15 of a machine cover 16. Also, as asterisk type character 17a on each rubber segment 14 is normally located at a printing line, opposite a platen section 18 of a printing member 19. The member 19 is pivotally supported at 63 for movement toward the sectors 11 to impress a check or the like 65 against aligned type characters 17 as will be described later.

In order to set up amounts in the sectors 11, the user places his finger in a selected finger space of a sector 11 and rotates the sector counterclockwise until his finger strikes the shelf 15, thereby presenting the corresponding type character 17 at the printing line.

In order to prevent smudging of the check 65 when inserting the same to be imprinted, a thin flexible mask 73 is supported by a fame tie rod 25 in position over the various inked segments 14 and has openings 74 therein aligned with the type characters 17 located at the printing line.

The input sectors 11 are yieldably detented in different set positions and, for this purpose, a pair of juxtaposed bars 27 and 28 are suitably secured to side frame plates i.e. 26, and extend through openings 30 in the various sectors 11. Detent balls 31 are slideably supported in transverse openings in the bar 28 and are urged outwardly by respective compression springs 32 to yieldably engage detent notches 33 formed in the sectors 11.

The checkwriter is driven by a motor (not shown) through a cyclically operable clutch generally indicated at 34, FIG. 4. The latter comprises a motor driven ratchet wheel 35 rotatably mounted on a main drive shaft 36 to which shaft is attached a clutch disc 37. A clutch pawl 38 is pivoted on the clutch disc 37 at 40 and is urged counterclockwise by a tension spring 41 but is normally held out of engagement with the ratchet wheel 35 by a clutch dog 42 pivotally supported at 43 and urged counterclockwise into its illustrated clutch disengaging position by a tension spring 44.

For the purpose of causing a cycle of operation of the checkwriter, a depressible motor control bar 45 is slideably supported on a pair of frame pins 46 and 47 and has an extension 48 overlying an ear 50 on a bail 51 which is pivotally supported on the frame pin 47. The bail is pivotally connected at 52 to a link 53. The latter has a notch 54 normally held in embracement with an ear 55 on the clutch dog 42 by a tension spring 56 extending between the link 53 and the bail 51. The spring 56 also acts through the bail 51 to normally maintain the motor bar 45 in its illustrated raised position.

Upon depression of the motor control bar 45, the bail 51 is rocked counterclockwise, causing an ear 57 thereon to effect closing of a motor switch 58 and to concurrently cause link 53 to release clutch dog 42 to allow the clutch pawl 38 to engage the clutch. During rotation of the clutch disc 37, a pin 60

thereon engages the line 53 to release the same from the clutch control lever 42 so that the latter may cause disengagement of the clutch after one complete revolution of the shaft 36, even through the motor bar 45 may continue to be held depressed.

The main shaft 36 carries a printer control cam 61, FIG. 1, which engages a cam follower portion 62 formed on the printer member 19. The latter is held in engagement with the cam 61 by a spring 64 tensioned between the member and an element 65 freely supported by the rock shaft 12. Accordingly, during the early part of each checkwriter cycle, the member 19 will be rocked counterclockwise causing the platen section 18 thereon to imprint the check 65 against an aligned set of type characters 17 which have been moved to the printing line by the sectors 11. During the printing impression the mask 73 will yield to permit imprinting.

In order to vertically adjust the location of the print line on the check 65, a pair of intermeshed sectors 66 and 67, FIGS. 1 and 2, are pivotally supported on pins 68 and 69, respectively, extending from the printing member 19. Pins 70 and 71 are formed on the sectors 66 and 67 and extend through arcuate slots 72 in the printer member 19 to underlie the check 65 and thus locate the same vertically. Warped spring clips 73' are also mounted on the pins 68 and 69 and frictionally engage the sectors 66 and 67 to yieldably hold the sections in different set positions. By manually moving one of the sectors, both pins 70 and 71 will be adjusted like amounts vertically to determine the position of the print line on the check.

For the purpose of indicating at all times the balance of the user's bank account, an accumulator, generally indicated at 75, FIGS. 1, 8, 10 and 11, is provided and is digitized in accordance with amounts set up in the input sectors 11. The accumulator is of the crawl type, similar to that disclosed in the aforementioned M. W. Gary Pat. No. 3,570,756.

The accumulator 75 is normally controlled to subtract an amount set up on the input sectors 11 from a total registered in the accumulator and representing the balance in the user's bank account. However, by setting an appropriate control, to be described later, amounts set up in the input sectors 11 and representing an amount deposited in the user's bank account will be added to the accumulator.

The accumulator 75 comprises an accumulator shaft 76 guided for fore and aft transverse movement in guide slots 77, FIG. 8, formed in the side frame plates 26. Each denominational order of the accumulator except the highermost or lefthand one, comprises a dial element 78 on which two series of numerals 90 are marked therearound, each series ranging progressively from "0" to "9". Also integral with each dial element 78 is a set of 20 internal gear teeth 80, an eccentric hub 81 and a double snail cam 82, see also FIG. 11. The dial elements 78 are independently rotatable on the accumulator shaft 76.

A floating gear 79 having 18 gear teeth 83 thereon is rotatably mounted on a respective eccentric hub 81 and meshes with the teeth 80 of the associated dial element 78.

An accumulator gear 84, having 18 teeth 85 on the outer periphery thereof, is rotatably mounted on an annular flange 86 on the associated dial element 78 and has nine gear teeth elements 87 which mesh with nine gear teeth elements 88 on the floating gear 79.

From the above it will be seen that each accumulator gear 84 is entrained in a nine to ten ratio with its associated dial element 78 through a floating gear 79. Accordingly, each dial element 78 receives rotation from both its associated accumulator gear 84 and the dial element 78 in the next lower denominational order. The relationship between the gears is such that each dial element 78 will receive one digital increment of movement from its associated accumulator gear 84 upon movement of the latter one digital increment and it will receive one tenth of a digital increment upon movement of the dial element 78 in the next lower denominational order one digital increment so that tens transfers may be effected simultaneously with digitation in either of opposite directions de-

pending upon whether additive or subtractive entries are being made.

Suitable means, not shown, is provided to prevent rotation of the lowermost denominational order dial element 78.

In order to align the dial elements 78 along a horizontal reading line whereby the numerals 90 thereon may be read through opening 91, FIG. 1, in the machine cover 16, regardless of any partial tens transfer increments transferred thereto from lower denominational orders, each snail cam 82 controls a respective cam follower 91, FIGS. 1 and 11 having slots 92 therein slideably embracing spaced support rods 93 and 94. Each cam follower 91 has a sensing nose 95 engageable with the associated snail cam 82 and a rack gear section 96 which meshes with the accumulator gear 84 in the next higher denominational order.

The cam followers 91 are normally held down, out of engagement with their respective snail cams 82, during digitation of the accumulator gears 84 and are moved into engagement with such snail cams at the end of each cycle whereby to compensate for any partial rotation of the associated dial element due to entry of a tens transfer increment thereinto. For this purpose, the cam followers 91 are connected to the free ends of leaf springs 97 attached to a bail 98, FIGS. 1, 8 and 9, which is pivotally supported on a rod 100 and is connected at 101, FIG. 9, to a lever 102. The latter is also pivoted on rod 100 and is coupled through a pin and slot connections 103 to a cam follower lever 104. The lever 104 is pivoted on a frame pin 105 and engages a cam 106 carried by the main shaft 36.

When the checkwriter is in its illustrated full cycle position, the cam follower 104 is moved into engagement with the bottom of a depression 107 in the cam 106 by a tension spring 108 connected to the bail 98, thereby stressing the leaf springs 97 to urge the cam followers 91 against respective ones of the snail cams 82 and thus hold the various dial elements 78 in positions wherein the numbers 90 thereon are located on a common reading line under the machine cover openings 91. At the start of a checkwriter cycle, the cam 106 will rock the cam follower 104, and consequently, bail 98 cause the leaf spring 97 to retract the cam follower 91 downwardly, out of engagement with the snail cams 82 so that the accumulator may be driven in either direction.

As noted heretofore, the checkwriter is normally conditioned to cause amounts set up in the sectors 11 to be subtracted from the accumulator 75. For this purpose, each sector 11 has a gear segment 110 which meshes with an intermediate gear 111, the latter meshing with an add pinion 112 which, in turn, meshes with a subtract pinion 113. The various intermediate gears 111 are freely and independently rotatable on the drive shaft 36 while the gears 112 and 113 are freely and independently rotatable on shafts 114 and 115, respectively, which are carried at their ends by triangular plates 116, FIGS. 1, 5 and 8, freely pivoted on the drive shaft 36.

Normally, the add-subtract gear assembly, including gears 112 and 113, is normally held in its illustrated raised position wherein the subtract idlers 113 are located directly opposite, but out of mesh with, the accumulator gears 84. For this purpose, a spring 172, FIG. 5, is tensioned between a pin 165 on one of the plates 116 and a frame pin 173. Also the shaft 115 is engaged by the inclined surface 117 of a latch lever 118. The latter is pivotally supported at 120 and is normally held in its clockwise rocked position by a tension spring 121.

During the normal subtract cycle of the checkwriter, the accumulator 75 is moved laterally to mesh the accumulator gears 84 with the subtract gears 113 and the input sectors 11 are thereafter returned from manually set positions to subtract the amount printed on the check from the total registered by the accumulator. For this purpose, cams, one of which, is shown at 123, FIG. 5, each have a cam groove 124 therein engaged by a pin 125, see also FIG. 1, forming part of a bell crank 126. The latter is pivotally supported at 127 and has a bifurcated end portion 128 which engages one end of the accumulator shaft 76. Thus, during the early part of a cycle, the accumulator is moved rearwardly to mesh the accumulator gears 84 with the subtract gears 113.

A bail rod 130, FIGS. 1 and 8, extends through the openings 30 in the various input sectors 11 and is supported at opposite ends by arms, one of which is shown at 132, fastened to the rock shaft 12. The bail rod 130 is held in engagement with shoulders 131 on the sectors 11, by a tensioned between the arm 132 and the frame tie rod 25. A gear sector 134, FIG. 6, is attached to the shaft 12 and arm 132 and has a series of seven teeth 135, see also FIG. 7, which are in line with a series of seven teeth 136 formed on a mutilated gear 137 which is attached to the drive shaft 36. Accordingly, when any of the input sectors is manually advanced counterclockwise to enter a digital amount, the bail rod 130 and sector 134 will be rocked to locate the gear teeth 135 in the path of teeth 136. During the latter half of the cycle, the teeth 136 will mesh with the teeth 135, thereby driving any set ones of the input sectors 11 toward their home positions and at the same time, subtracting amounts registered by the sectors 11 from the total registered by the accumulator.

As the input sectors 11 are returned by the bail rod 130 to their "0" positions, one increment prior to reaching their final home positions, the gear teeth 136 demesh from the sector gear teeth 135 and shortly thereafter the arms 126 are actuated by cams 123 to remove the accumulator 75 from mesh with the subtract gears 113.

Means are provided to prevent overthrow of the relatively heavy input sectors 11 toward their illustrated home or asterisk indicating positions as they reach their "0" positions so as to prevent possible overthrow of the accumulator. This means is positively acting and thus does not impose any limitation on the speed of operation of the checkwriter. For this purpose, a bail 140, FIG. 1, extends across the various input sectors 11 and is pivotally supported at 141 and is coupled by a slot 142 to the aforementioned pins 125. Accordingly, when the arms 126 are rocked clockwise to mesh the accumulator 75 with the gears 113, the bail 141 is rocked into an alternate position indicated by dot-dash lines 140a into the paths of shoulders 143 formed on the sectors 11. Thus, such shoulders 143 arrest against the bail 140 when the sectors reach their "0" positions to block the sectors 11 and accumulator against overthrow. However, if the sectors 11 have not been previously moved out of their home or "asterisk" positions, the bail 140 will engage within V shaped notches 144 formed in the sectors.

Toward the end of the cycle, and when the accumulator 75 is returned out of mesh with the subtract gears 113, the bail 140 will be rocked back to its full line position of FIG. 1 and shortly thereafter an offset gear tooth 145 on mutilated gear 137 will engage a second offset gear tooth 146 on the sector 134 to advance the latter and thereby all previously set sectors 11 one further increment to their initial illustrated home or asterisk printing positions.

When an amount greater than that registered by the accumulator is subtracted therefrom, the accumulator becomes negatively overdrafted and in this condition the highermost denominational order dial element 78a, FIG. 10, moves from its "0" registration to a "9" registration. Such dial element 87a differs from the remaining dial elements 78 in that it contains a two level annular flange 147, FIGS. 8 and 10, in lieu of a snail cam 82. The flange 147 is sensed by a sensing lever 148 fulcrumed at 150 and integral with an arm 151 connected by a wire link 152 to an overdraft latch 153 pivotally supported at 154. A tension spring 155 urges the latch 153 towards latching engagement with the arm 132 carrying the bail rod 130 but the latch 153 is normally prevented from moving into latching engagement by engagement of the sensing lever 148 with the high level periphery of the annular flange 147 when no negative overdraft exists. When a negative overdraft occurs, the dial element 78a will be rotated one increment in a subtractive or clockwise direction to indicate a "9" registration, thus locating a low level flange section 156 opposite the sensing lever 148. Thus, the spring 155 becomes effective to rock the latch 153 into latching engagement with the arm 132, preventing setting of a new amount into the input sectors 11. This will apprise the operator that his bank account has been overdrawn and that a deposit must be made.

Means are provided to prevent latching of the arm 132 by the overdraft latch 153 during a cycle and for this purpose an arm 157, FIG. 8, is secured to the bail 98 and extends behind the arm 151. During a cycle the bail 98 is rocked counterclockwise causing the arm 157 to engage the arm 151 and thus hold the latch 153 out of engagement with the arm 132 even though the accumulator may become negatively overdrafted during such current cycle.

Means are provided to enter amounts additively into the accumulator to represent amounts deposited in the user's bank account. For this purpose, a deposit key 160, FIG. 5, is slideably supported by the frame pins 46 and 47 and is coupled through a pin and slot connection 161 to an arm 162 pivotally supported at 163 in having a slot 164 thereon embracing a pin 165 attached to the triangular support plate 116 of the add-subtract gear assembly. Thus, upon depression of the deposit key 160, the add-subtract assembly will be lowered causing the shaft 115 to cam along the inclined surface 117 of the latch lever 118 until the add gears 112 are located directly opposite the accumulator gears 84. In such position, the shaft 115 is engaged by a notch 166 in the latch lever 118, thereby latching the add-subtract assembly in its lowermost "add" condition. During an ensuing cycle initiated by depression of the motor control bar 45, the accumulator will be moved into mesh with the add gears 112 so that during movement of the sectors 11 toward their home positions by the bail rod 130, amounts previously registered by the sectors will be entered additively into the accumulator.

Toward the end of an add or deposit cycle, a pin 170 on the cam 123 will engage an inclined surface 171 on the latch lever 118 to rock the latter counterclockwise and thus release the shaft 115, permitting the tension spring 172 to return the add-subtract assembly to its upper illustrated subtract position.

It will be recalled that when a negative overdraft occurs the input sectors will be locked up by the latch 153 from again subtracting additional amounts from the accumulator. However, upon setting the add-subtract gear assembly into its lower "add" condition, the shaft 115 will move to its lower position 115a, FIG. 8, during which it strikes the sensing lever 148 to rock the latch 153 out of latching engagement with the arm 132 so that amounts to be deposited can be set up on the sectors.

Means are provided for preventing depression of the deposit key 160 during a cycle. For this purpose, the cam 123 is notched at 175 and a lobe 176 is formed on the latch lever 118 in line with the cam. Thus, the lobe 176 can move into the notch 175 only when the cam 123 is in full cycle position.

I claim:

1. In a checkwriter having an accumulator, the combination comprising means including a plurality of manually settable sectors, each of said sectors being differentially settable from a home position for setting up an amount to be printed, each of said sectors being effective when in said home position to set up a special symbol to be printed; cyclically operable drive means, means operable by said drive means for printing amounts and symbols set up by said sectors, means operable by said drive means for thereafter returning said sectors to said home positions, said last mentioned means being effective to momentarily arrest said sectors when said sectors register zero, means for operatively connecting said accumulator to said sectors during said return movement of said sectors whereby to drive said accumulator, and means for disconnecting said accumulator when said sectors are momentarily arrested.
2. The combination according to claim 1 wherein said means for returning said sectors comprises a series of intermeshing gear teeth, said series of teeth being interrupted whereby to momentarily arrest the return movement of said sectors when said sectors register zero.
3. The combination according to claim 1 comprising means for blocking said sectors on zero registering position,

and means operable by said drive means for rendering said blocking means effective when said sectors move toward zero register positions and for rendering said blocking means ineffective upon said disconnection of said accumulator.

4. The combination according to claim 1 comprising means for blocking said sectors in zero registering positions, means operable by said drive means for connecting said accumulator and for rendering said blocking means effective,

said last mentioned means being effective to concurrently disconnect said accumulator and to render said blocking means ineffective after said sectors are blocked in zero registering positions.

5. The combination according to claim 1 comprising means for blocking said sectors in zero registering positions, and means controlled by said drive means after said sectors are blocked in zero registering position for rendering said blocking means ineffective and for disconnecting said accumulator.

6. The combination according to claim 1 wherein said means for operatively connecting said accumulator to said sectors comprises gear trains having oppositely rotatable sets of gears,

means for normally entraining one of said sets of gears with said accumulator, and selectively settable means for entraining the other of said sets of gears with said accumulator.

7. The combination according to claim 1 wherein said means for operatively connecting said accumulator to said sectors comprises gear members driven by said sectors, a first set of gears meshing with said gear members, a second set of gears meshing with said first set of gears, means for normally entraining one of said sets of gears with said accumulator during said return movement of said sectors whereby to drive said accumulator in one direction, and selectively settable means for moving said first and second sets of gears together about the axes of said gear

members whereby to enable said last mentioned means to entrain the other of said sets of gears with said accumulator during said return movement of said sectors whereby to drive said accumulator in the opposite direction.

8. In a checkwriter having an accumulator, the combination comprising means including a plurality of manually settable sectors, each of said sectors being differentially settable from a home position for setting up an amount from zero to nine to be printed, each of said sectors being effective when in said home position to set up a special symbol to be printed; cyclically operable drive means, means operable by said drive means for printing amounts and symbols set up by said sectors, means operable by said drive means for thereafter returning said sectors to said home positions, said last mentioned means being effective to momentarily arrest said sectors when said sectors register zero, means for operably connecting said accumulator to said sectors during said return movement of said sectors whereby to drive said accumulator, said last mentioned means comprising members driven by said sectors, a first set of gears meshing with said first set of gears; said sets of gears being moveable about the axes of said gear members from one position wherein said first set of gears is effective to drive said accumulator in one direction to a second position wherein said second set of gears is effective to drive said accumulator in the opposite direction, spring means for normally maintaining said sets of gears in said first position, means including a depressible key for moving said sets of gears into said second position; a latch for maintaining said sets of gears in said second position, and means controlled by said drive means for invariably releasing said latch after said sectors are returned to said zero positions.

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