May 13, 1941. W. E. EICKMAN 2,241,987

CASH REGISTER

Filed April 16, 1938 2 Sheets-Sheet 1

FIG. 1

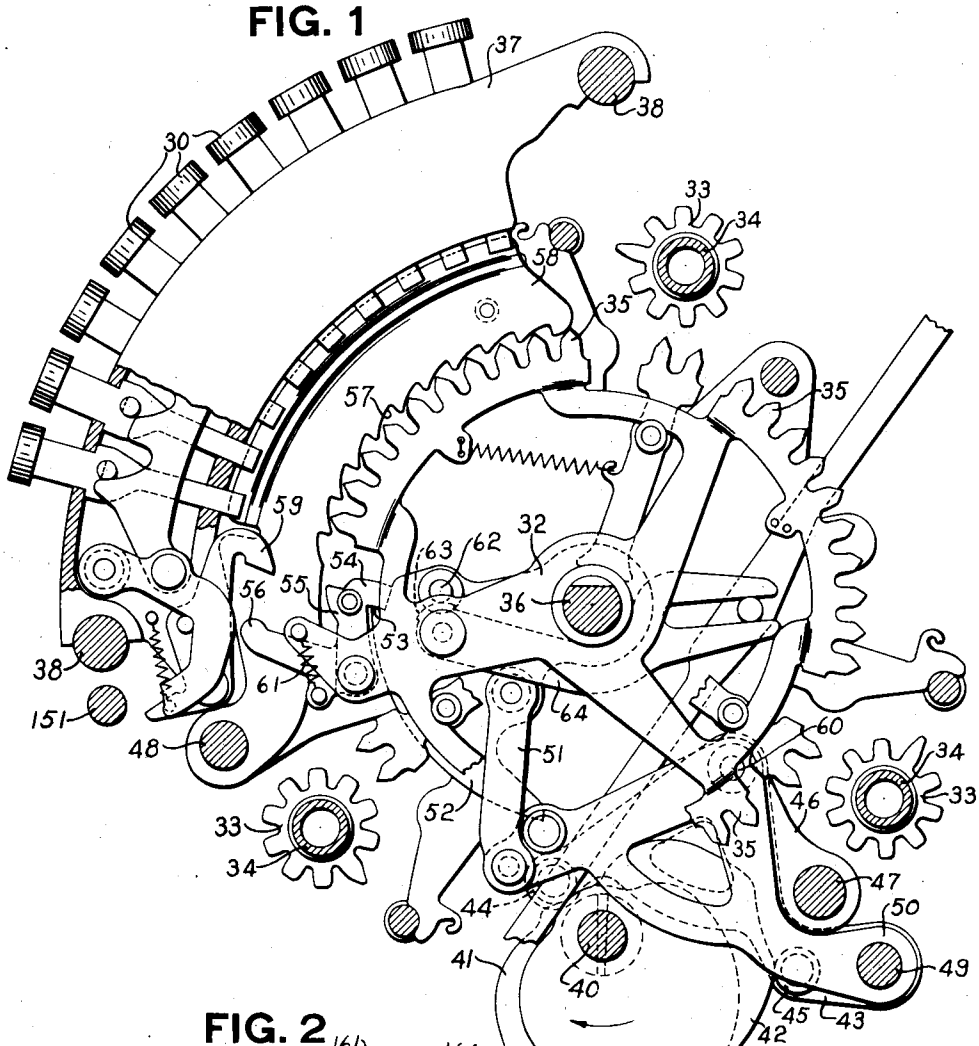


FIG. 2

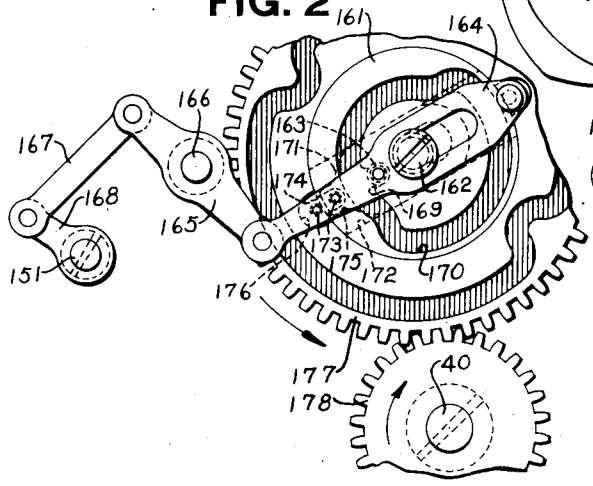
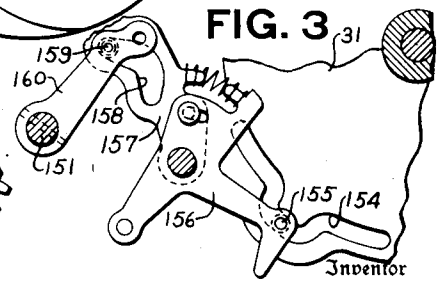


FIG. 3



Inventor
Willis E. Eickman
By
Earl Burst
His Attorney

May 13, 1941. W. E. EICKMAN 2,241,987

CASH REGISTER

Filed April 16, 1938 2 Sheets-Sheet 2

FIG. 4

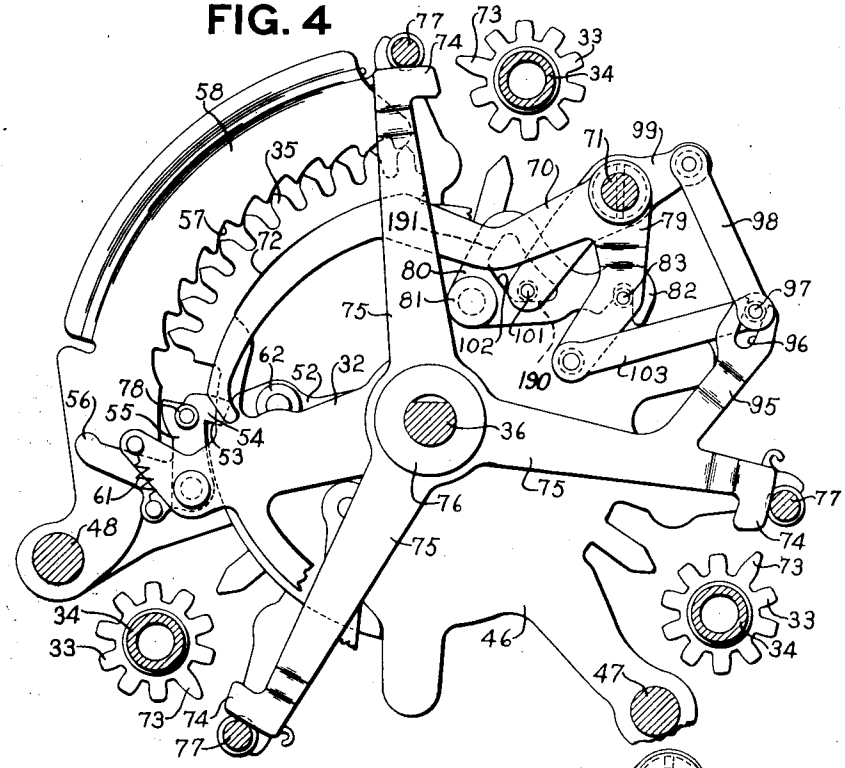
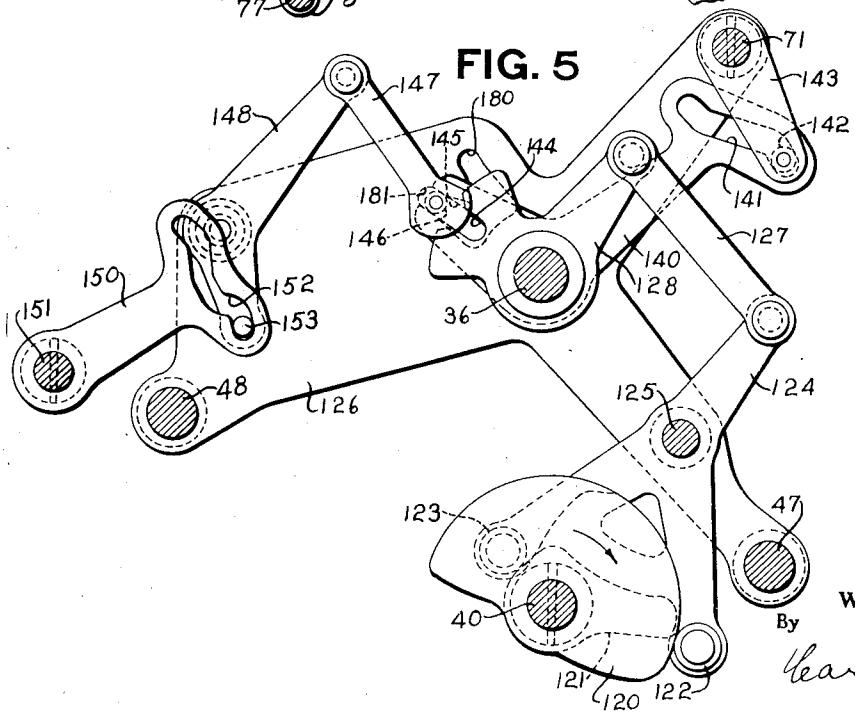


FIG. 5



Inventor
Willis E. Eickman
By
Earl Brust
His Attorney

Patented May 13, 1941 2,241,987

UNITED STATES PATENT OFFICE

2,241,987

CASH REGISTER

Willis E. Eickman, Dayton, Ohio, assignor to The National Cash Register Company, Dayton, Ohio, a corporation of Maryland

Application April 16, 1938, Serial No. 202,375

10 Claims. (Cl. 235—8)

This invention relates to cash registers and accounting machines of the general type shown in United States patent to Bernis M. Shipley No. 1,619,796 granted March 1, 1927, and more particularly to resetting mechanism for the totalizers.

The principal object of this invention is to provide improved means, simple in construction and positive in its action, for controlling the differentially movable actuators during total taking or resetting operations.

Another object is to provide novel means, under control of the totalizer wheels, for disengaging the differential latches during total taking or resetting operations to thereby differentially control the positioning of the actuators commensurate with the amounts on the totalizers.

An additional object is to provide a normally latched means for disengaging the latches of a differential mechanism, and means to unlatch the normally latched means to release the latter for operation during a total taking or resetting operation.

A further object is to provide a control member settable into position to cooperate with a totalizer wheel during a total taking or resetting operation, and operable by the totalizer wheel when at its zero position to control the differential positioning of the totalizer actuator, said member being provided with a separate connection for each of said movements.

With these and incidental objects in view, the invention includes certain novel features of construction and combinations of parts, the essential elements of which are set forth in appended claims and a preferred form or embodiment of which is hereinafter described with reference to the drawings which accompany and form a part of this specification.

Of said drawings:

Fig. 1 is a sectional view in right elevation of one of the banks of amount keys and the differential mechanism associated therewith.

Fig. 2 shows a portion of the mechanism for changing the machine from a single cycle to a double cycle operation.

Fig. 3 is a fragmentary side view of the lower portion of the total control lever and a portion of the mechanism which cooperates therewith.

Fig. 4 is a sectional view in right elevation of the latch releasing element and a totalizer-wheel-actuated control member for the element.

Fig. 5 is a detail side view of the means for driving said control member.

General Description

In general, the present invention is somewhat similar to that disclosed in United States Patent No. 1,702,861, issued February 19, 1929, to Samuel Brand, but is an improvement thereon. It will be obvious from the following description that the present invention provides a mechanism more simple in construction and more positive in its operation than that disclosed in the aforesaid Brand patent, whereby the result is accomplished in an improved manner.

The machine shown in the present application has three lines of totalizers, arranged around a series of denominational circular adding racks or actuators, controlled as to their extent of movement in adding operations by banks or rows of depressible amount keys. The control of each actuator by its bank or row of keys is accomplished by means of a coupling or latch mechanism with which each actuator is provided, which latch is adapted to be disengaged from an invariably movable driver, so that the actuator may be arrested under control of a depressed key in a position corresponding to the value of the key depressed.

After the actuators have been adjusted under control of the depressed keys, the totalizer wheels composing the selected totalizer or totalizers are engaged with their respective actuators, after which the actuators are returned to their normal positions, to enter on the selected totalizer or totalizers the amount corresponding to the value of the keys depressed.

To take a total from any of the totalizers, and reset said totalizers to zero, a manually operable control or total lever is first adjusted to the proper position to select the particular totalizer line which carries the particular totalizers to be reset. The totalizer wheels of the selected totalizers are then engaged with their respective actuators, and the drivers turn the actuators and the engaged totalizer wheels until the latches of the actuators are disconnected from the invariably movable drivers by means under control of long teeth on the totalizer wheels as said wheels reach their "zero" position. The long teeth of all totalizer wheels of like denomination, irrespective of the number of such wheels, each operates a single zero resetting control member common to the totalizer wheels of like denomination on all the totalizer lines, which, through a novel latch releasing mechanism, causes the latches of the series of denominational actuators to be disconnected from their corresponding

drivers as their associated totalizer wheels reach "zero" position.

Detailed Description

The present invention is shown embodied in a machine of the general type illustrated and described in the above mentioned Shipley patent, to which reference is hereby made for a complete disclosure of those features of the machine which are not specifically disclosed in this application. Although the invention is shown embodied in a machine of the general type disclosed in said patent, it is manifest that the invention may be embodied in other kinds of machines employing a similar type of differential mechanism.

Keyboard

Such machines are provided with a number of denominational rows or banks of amount keys 39 (Fig. 1) carried by the usual key frames 37 supported by rods 38.

Also, such machines are equipped with rows or banks of totalizer-selecting keys, there being as many rows or banks of said keys as there are totalizer lines, and as many keys in each bank or row as there are totalizers in the respective lines. Such keys are fully illustrated and described in the aforesaid Shipley patent and are therefore not shown or described in detail herein.

Furthermore, a total control lever 31 (Fig. 3), only the lower portion of which is shown, is provided, one of the functions of which is to set up a condition in the machine so that upon operation of the latter the total of an accumulation on any desired or selected totalizer will be printed and the totalizer cleared. The total lever 31, when moved into a total or subtotal position, controls the usual mechanism for conditioning the machine for a double cycle operation, which mechanism is fully illustrated and described in the above mentioned Shipley patent. A complete showing and description of the construction and operation of this lever are also to be found in said Shipley patent.

Totalizers and Differential Mechanism

The several totalizer lines are arranged at substantially equi-distant points around a single series of actuators 32, mounted to turn on a shaft 36. Taking a single line as illustrative of the three lines shown, the totalizers on such line each comprise a series of totalizer wheels 33 (Figs. 1 and 4) independently journaled on a tubular axle or shaft 34, the "units" wheels of the several totalizers being grouped near one end thereof and adjacent the "units" actuator 32, common thereto, the "tens" wheels of the several totalizers forming the next group to the left of the "units" group and adjacent the "tens" actuator 32, and so on, as is customary in such types of machines.

The actuators 32 have toothed racks 35, located opposite each of the respective totalizer lines, to cooperate with the totalizer wheels 33 on said lines. In the present instance each actuator 32 has formed integral therewith three toothed racks 35, arranged equi-distant about the periphery thereof, to cooperate with several totalizer wheels 33 of like denomination on the three totalizer lines. Hence each denominational actuator 32 is common to the totalizer wheels 33 of like denomination on the several totalizer lines.

The machine is provided with a main drive shaft 40 (Fig. 1), which may be operated either by hand or motor, as preferred, in the usual manner. The shaft 40, as is customary in such machines, is given one complete clockwise rotation during single cycle or adding operations and two complete clockwise rotations during double cycle or total taking operations. Since the mode of operating the shaft 40 is old and well known in the art, as disclosed in the Shipley patent previously referred to, no complete showing or description thereof will be given herein.

The main drive shaft 40 has secured thereon two pairs of cams 41 and 42 (only one pair of which is shown), which serve to actuate mechanism for oscillating a series of denominational drivers 52, segmental in shape, throughout a constant path of travel, first clockwise and then counter-clockwise, during each cycle of operation of the machine. The drivers 52 are pivoted on the shaft 36. The mechanism thus actuated by the two pairs of cams 41 and 42 consists of two levers 43 (only one being shown), each of which is located adjacent a pair of cams and carries a pair of rollers 44 and 45 coacting with the cams 41 and 42, respectively. The levers 43 are each pivoted on a stud 60 on separate hangers 46 supported on rods 47 and 48 mounted in the machine side frames. The two pairs of cams 41 and 42, through the rollers 44 and 45, rock the levers 43 first clockwise then counter-clockwise during each cycle of operation of the machine, which movement, through a rod 49 carried by the levers 43, is imparted to a series of levers 50 secured to said rod. The levers 50, in turn, are each pivotally mounted on the studs 60 in the various hangers 46 and are connected by links 51 to related denominational drivers 52, thus transmitting the same movement to said drivers.

The drivers 52 lie adjacent their corresponding denominational actuators 32, and each driver is provided with a shoulder 53 which is normally engaged with a foot 54 of a latch 55 pivotally carried by its respective actuator 32, so that unless the latches 55 are disengaged from their drivers 52, the latter will rock the actuators 32 throughout their paths of advance travel. The latches 55 are normally held in engagement with their drivers 52 by springs 61.

However, means is provided to automatically disengage the latches 55 individually from their drivers 52 under several operating conditions of the machine, as will presently appear, so as to allow the drivers 52 to complete their invariable travel in a clockwise direction while the actuators 32 remain at whatever points they stand when the disengagement occurs. A forwardly extending arm 56 on each of said latches 55 cooperates with various latch-controlling means, through which the latches 55 are disengaged from their drivers 52 to arrest the actuators 32.

In an adding operation the amount is set up on the keyboard by depressing the proper keys 39, thereby introducing the inner ends of the depressed keys into the path of the arms 56 of the latches 55.

The operator also depresses the proper totalizer-selecting key (not shown), which sets the mechanism to select the particular totalizer on which he wishes to accumulate this amount, and then operates the machine by depressing the usual machine release bar (not shown).

As previously mentioned, the main drive shaft 40 makes a single complete rotation on adding operations, during which it first rocks the group of drivers 52 clockwise and then counter-clockwise. The drivers 52, during their clockwise movement, advance those actuators 32 corre-

sponding in denomination with the depressed keys **30** until the projecting arms **56** of the latches **55** strike and are arrested by the inner ends of the depressed keys, whereupon, as the drivers **52** continue their travel, the latches **55** are rocked counter-clockwise to withdraw the feet **54** thereof from engagement with the shoulders **53** of the drivers **52** and to engage the forward ends of the latches **55** with notches **57**, in the usual locking bars **58**, opposite the positions at which the latches **55** have been arrested.

Obviously the arresting of the latches **55** by the depressed keys **30** and the engagement of the forward ends of the latches with the notched locking bars **58** arrest the actuators **32** in positions corresponding to the values of the depressed keys.

In those banks in which no key **30** has been depressed, the arms **56** of the latches **55** associated therewith strike and are arrested by zero stop pawls **59**, thus arresting their associated actuators in the zero position. Depression of a key **30** in any bank also acts to move the pawl **59** associated therewith out of the path of the arm **56** of the latch **55** corresponding thereto. The construction and function of the pawls **59** are old and well known in the art, as disclosed in the Shipley patent previously referred to, and therefore need not be discussed in detail herein.

The wheels **33** of the selected totalizers, which have been out of mesh with their appropriate actuator racks **35** while the actuators **32** advance until arrested by the depressed keys **30**, now engage the racks **35** of the differentially adjusted actuators **32**, after which the actuators are restored to their normal positions by studs **62** on the drivers **52** contacting raised surface **63** on the usual beam **64** carried by the actuator **32**, and in so doing the racks **35** turn the totalizer wheels **33** clockwise to register thereon the amount represented by the depressed keys.

Totalizer Engaging Mechanism

The mechanism for engaging the totalizer wheels **33** with their actuators **32** is fully shown and described in the above mentioned Shipley patent, and is not shown or described in detail herein. This mechanism engages the totalizer wheels **33** of the selected totalizers with their actuator racks **35** immediately after the actuators have been adjusted under control of the amount keys. After the actuators **32** have been restored to their normal positions and the amount entered into the totalizer or totalizers, said mechanism disengages the selected totalizer or totalizers from the actuator racks **35** in the usual manner.

Totalizer resetting

When it is desired to take a total or sub-total from any particular totalizer, the total lever **31** is manually moved from its normal add position (Fig. 3) to select the totalizer line in which a totalizer from which a total is to be taken is located. There are the usual three positions above the add position for taking sub-totals and the usual three positions below the add position for taking totals. The proper totalizer-selecting key (not shown) is then depressed to control the endwise shifting of the totalizer line to bring the desired totalizer into alignment with the actuator racks **35**. The mechanism for accomplishing the results just mentioned is old and well known in the art, as disclosed in the Shipley patent hereinbefore referred to, and therefore is not shown or described in detail herein.

The total lever **31**, when moved to one of its total taking positions, adjusts the totalizer engaging mechanism so that the totalizer line selected by said lever is rocked to engage the selected totalizer wheels **33** with the racks **35** near the end of the first cycle of said operation.

It is thus apparent that the totalizer wheels **33** are not engaged with the actuator racks **35** during the first cycle of a total taking operation; also the zero stop pawls **59** act to disengage the latches **55** from their drivers **52** during the first cycle of a total taking operation, thus arresting their corresponding actuators **32** in their "zero" positions. The totalizer wheels **33** are accordingly not reset during the first cycle of operation.

Near the end of the first cycle of operation, the pawls **59** are automatically rocked out of the paths of travel of the arms **56** of the latches **55**, and are not returned to their normal positions until near the end of the second cycle of said operation, after the actuators **32** have been restored to their home positions. It will thus be seen that the actuators **32** will be free to move with their associated drivers **52** during the second cycle of operation until they are disengaged therefrom by means, to be later described, under control of the totalizer wheels **33**.

With the totalizer wheels **33** in engagement with their respective actuator racks **35** at the beginning of the second cycle of operation, as above described, said wheels are turned counter-clockwise by the racks **35** as the latter are rocked clockwise by their drivers **52** until said wheels reach their "zero" positions, in which position they are to be arrested.

Control of latches by totalizer wheels

In such total taking or sub-total taking operations it is necessary to disconnect the actuators **32** from the drivers **52** by means under control of the wheels **33** when the latter arrive at their "zero" positions, and it is the mechanism for accomplishing this result which the present invention has simplified and made more positive in its operation.

To this end the present invention provides novel mechanism for controlling the resetting of the totalizer wheels to zero, and novel latch-releasing mechanism operable to disconnect the actuators **32** from their drivers **52** differentially, depending upon the amounts registered on the individual wheels **33** of the totalizer being cleared, said mechanism being common to the several totalizer wheels of like denomination.

If the machine has been conditioned for taking a total from the selected totalizer and, at the same time, resetting the adding wheels **33** to their "zero" positions, the totalizer engaging and disengaging mechanism will disengage the wheels **33** from their respective actuators **32** after the said actuators have been differentially positioned under control of the totalizer wheels **33** and before the actuators are returned counter-clockwise to their normal positions, thus leaving the totalizer wheels in their "zero" positions.

If, on the other hand, a sub-total or read operation is being performed, in which operation the totalizers have returned to them the amounts taken from them, the totalizer engaging and disengaging mechanism will maintain the engagement of the wheels **33** of the selected totalizers wtih their corresponding actuators **32** until after said actuators are returned counter-clockwise to

their normal positions, thus turning the wheels 33 clockwise to the positions which they were in at the beginning of the operation.

As shown in Fig. 4, there is provided a latch releasing lever 70, one associated with each actuator 32, for releasing the differential latches 55 from the drivers 52 during total taking or sub-total taking operations. The levers 70 are pivotally mounted on a shaft 71 journaled at its ends in the usual side frames of the machine. The forward arm of each lever 70 has an arcuate outer edge 72 concentric with the shaft 36 and coextensive in length with the extreme path of travel of its corresponding actuator 32, and lies adjacent the path of the latch 55 carried by said actuator.

During the second cycle of a total or sub-total operation, when the actuators 32, whose racks 35 are engaged with the wheels 33 of a selected totalizer, turn the latter counter-clockwise to their "zero" positions, a long tooth 73 on each of said wheels will, as said wheels approach their zero positions, contact a toe 74 of a three armed lever 75 and rock the same to rock the lever 70 clockwise by means to be later described. The lever 75 has a hub 76 by means of which said lever is pivoted on the shaft 36. The outer ends of the lever 75 are guided by grooved rods 77 mounted in the machine side frames. As the lever 70 rocks clockwise its arcuate edge 72 contacts a roller 78 carried by the latch 55 on its corresponding actuator 32. As the actuator 32 advances in a clockwise direction, it drives the totalizer wheel 33, which, through the long tooth 73 and lever 75, rocks the lever 70, which rocks the latch 55 counter-clockwise to disengage it from its associated driver 52, whereupon the front of said latch engages the notch 57 opposite the position in which the disengagement of the latch occurs. The corresponding actuator 32 is accordingly arrested in a position corresponding to the amount taken from the totalizer wheel 32 with which it is engaged.

Each latch releasing lever 70 is normally held in an ineffective position by a locking arm 80 pivotally mounted on a stud 81 carried by its respective hanger 46. The arm 80 has a hook 82 which engages a stud 83 on an arm 79 of the lever 70.

Means, to be later described, is provided for moving the arm 80 counter-clockwise out of its effective locking position during the first cycle of a total or sub-total operation and maintaining it in such moved position until near the end of the second cycle of such operation to permit the release lever 70 to function.

The toes 74 of the three armed lever 75 normally lie out of the paths of the long teeth 73 of their associated denominational totalizer wheels, to avoid interference with the totalizer wheels in adding operations.

It is only during total or sub-total taking operations that the levers 75 control the latch releasing lever 70 to effect the arrestment of the actuators 32, and consequently of the totalizer wheels 33, when the latter, on their reverse rotations, reach their zero positions.

Considering a single denomination, such as that shown in Fig. 4, which is similar to all other denominations, it will be seen that the lever 75 has formed integral with its right-hand arm an additional arm 95 provided with a slot 96 into which projects a pin 97 carried by a link 98. The link 98 is pivoted to a lever 99 secured to the shaft 71 thus forming a connection between the lever 75 and the lever 99. The other end of the lever 99 carries a stud 101 which projects through and coacts with a cam slot 102 formed in the locking arm 80. The lever 99 when in its normal position, as shown in Fig. 4, serves to maintain the arm 80 in its effective position to retain the lever 75 out of cooperative relation with the long teeth 73 of its associated totalizer wheels 33, by maintaining the stud 101 against the horizontal wall 199 of the slot 102.

Means is provided for giving the shaft 71, and consequently the lever 99 fast thereon, a clockwise rotation during the first cycle of a total or a sub-total operation and then a counter-clockwise rotation near the end of the second cycle of such operation to return it to its home position. Such clockwise movement of the lever 99, through the link 98, moves the pin 97 downwardly in the slot 96 of the arm 95 to cam the three armed lever 75 clockwise to position its toes 74 so that the long tooth 73 on the wheel 33 of the selected and engaged totalizer can act on said lever 75 to control the disengagement of the latch 55 from its driver when said wheel 33 reaches zero position during a total or sub-total operation.

When the lever 99 is thus rocked clockwise it will, through the stud 101 coacting with the wall 191 of the cam slot 102, cam the locking arm 80 counter-clockwise and release its hook 82 from the arm 79 of the lever 70. This renders the lever 70 free to be actuated, through the lever 75, by the long tooth 73 of the selected totalizer wheels 33.

A link 103, pivoted to the arm 79 of the lever 70 and connected to the pin 97, forms the driving connection between the lever 75 and the lever 70.

The initial movement of the arm 99, through link 98 and stud 97, rocks the arm 75 clockwise, as above described. During this movement of the arm 75, the release lever 70 is held latched by the arm 80. Near the end of the clockwise movement of the arm 99, the stud 101 strikes the wall 191 of slot 102 and cams the arm 80 counter-clockwise (Fig. 4) to unlatch the release lever 70. The idle movement of the stud 101 in the slot 102 is provided to prevent the unlatching of the arm 82 until after the stud 97 has shifted the release lever 75 substantially into its effective position. Since the arm 79 is held during the initial movement of the stud 97, the link 103 pivots on arm 79. The arm 79 is released near the end of the movement of the stud 97 in notch 96, and at this time the notch 96 is located at such an angle that continued movement of the stud 97 in the notch 96 will not shift link 103 toward the left (Fig. 4). Therefore, when the shaft 71 has completed its movement, the lever 75 will be in the fully effective position, but the arm 70 will remain in the position shown.

From the foregoing it will be seen that when the totalizer wheel 33 which is engaged with the rack 35 of its associated actuator 32 is turned counter-clockwise by the latter to its zero position during the first half of the second cycle of operation, the long tooth 73 on said wheel will strike the toe 74 and cam the lever 75 counter-clockwise, whereupon the arm 95 moves the pin 97 toward the left, as viewed in Fig. 4. Inasmuch as the lever 99 is unyieldingly held in its moved clockwise position at this time by means to be later described, the lever 75 will, through the link 103, directly rock the lever 70 clockwise. Such clockwise movement of the lever 70, as heretofore explained, causes the arcuate edge 72 thereof to

contact the roller 78 and disengage the latch 55 from the driver 52, thereby arresting the advance movement of its actuator 32 in a position commensurate with the amount taken from the totalizer wheel 33.

As the shaft 71 and lever 99 are moved counter-clockwise to their home positions near the end of the second cycle of said operation, the lever 99, engaging the wall 190, will restore the arm 80 and the lever 75 to their normal positions.

Latch control coupling means

The driving means for rotating the shaft 71 and the lever 99 first clockwise and then counter-clockwise in the manner above described includes a pair of cams 120 and 121 (Fig. 5) secured on the main drive shaft 40. These cams coact with a pair of rollers 122 and 123, respectively, carried by a Y-shaped lever 124 pivoted at 125 to a hanger plate 126 mounted on the rods 47 and 48. The lever 124 is connected by a link 127 to the right-hand arm of a bell crank 128 freely mounted on the shaft 36. Upon each complete clockwise rotation of the shaft 40 during each cycle of operation, the cams 120 and 121 rock the lever 124 and, through the link 127, the bell crank 128 first clockwise and then counter-clockwise. The bell crank 128, in turn, is adapted to be coupled with means for transmitting said movements to the shaft 71 and the lever 99. This means will now be described.

Pivotally mounted on the shaft 36 is a lever 140, the right-hand arm of which (Fig. 5) is provided with a cam slot 141 through which projects a pin 142 on an arm 143 fast on the shaft 71. The lever 140, when coupled to the bell crank 128, acts as the means for transmitting movement to the shaft 71.

The left-hand arm of the bell crank 128 has a notch 144 in parallel relation with a notch 145 in the left-hand arm of the lever 140. These notches 144 and 145 of the bell crank 128 and the lever 140 cooperate with a coupling pin 146 to couple said driving bell crank 128 to said transmitting lever 140.

The coupling pin 146 is carried by a link 147 pivotally connected to a lever 148 pivoted to the hanger 126. The means for actuating and controlling such coupling means will now be described.

The means for operating said coupling means consists of an arm 150 (Fig. 5) fast on the usual zero stop pawl throwout shaft 151. This arm 150 has formed near its outer end a controlling slot 152 which coacts with a pin 153 on the lever 148. The control of said coupling means is brought about by the usual operation of the shaft 151 during total or sub-total taking operations. The operation of said shaft is old and well known in the art and is shown in the above mentioned Shipley patent, and will therefore be but briefly described here.

The total lever 31 (Fig. 3) is provided with a slot 154 which, when the total lever is moved to any of its total or sub-total taking positions, coacts with a pin 155 on an arm 156 to rock said arm counter-clockwise. The arm 156, in turn, is spring coupled to another arm 157 having formed therein a slot 158 coacting with a pin 159 in an arm 160 fast to the shaft 151. Thus, when the total lever 31 is moved to any of its total or sub-total taking positions it will, through the mechanism just described, give the shaft 151 an initial clockwise movement, prior to the operation of the machine.

Such initial clockwise movement of the shaft 151, by means of the cam slot 152 in the arm 150, moves the coupling pin 146 downwardly into the slot 144 of the bell crank 128 to couple said bell crank to the lever 140, thus coupling the driving means to the transmitting means.

In addition, such initial clockwise movement of the shaft 151 adjusts means whereby said shaft 151 is given a further clockwise movement near the end of the first cycle of total or sub-total operation. This means includes a cam disc 161 (Fig. 2) pivotally mounted on a stud 162 carried by the right side frame of the machine. The cam 161 cooperates with a roller 163 carried by a pitman 164 slidably mounted on the stud 162. Connected to the left-hand end of the pitman 164 is a lever 165 pivoted on a stud 166 and connected at its opposite end by a link 167 to an arm 168 secured to the shaft 151. The cam 161 is normally retained in an inoperative position by the roller 163 engaging a notch 169 formed in the inside wall of a cam groove 170 in the cam 161.

When the shaft 151 receives its initial clockwise movement, by the total lever 31 as previously described, it will, through the arm 168, link 167 and lever 165, slide the pitman 164 toward the left to withdraw the roller 163 from the notch 169 in the groove 170 of the cam disc 161. At the same time, a coupling plate 171 slidable in a groove 172 of the cam disc 161 is shifted by pins 173 in the pitman 168 engaging a lip 174 of the plate 171, to move an arm 175 of the plate 171 into a notch 176 of a main drive gear 177 in a well known manner, whereby they will be made to rotate in unison. The gear 177 is driven one half a rotation for each full rotation of the main drive shaft by a gear 178 on said shaft and one full rotation during total or sub-total operations. As the cam disc 161 rotates counter-clockwise with the gear 177 during the operation of the machine, said cam will, through the cam groove 170 therein coacting with the roller 163 near the end of the first cycle of said operation, rock the pitman 164 further toward the left and thereby, through the lever 165, link 167 and arm 168, give the shaft 151 its further clockwise movement.

The control of the shaft 151 from the total lever 31 and the cam disc 161, as above described, together with the mechanism associated therewith for conditioning the machine for double cycle operations, is all old and well known in the art, and reference is hereby made to the hereinbefore mentioned Shipley patent for a full showing and description thereof.

As the shaft 151 receives its further clockwise movement near the end of the first cycle of operation, as above described, it will, through the cam slot 152 (Fig. 5), withdraw the coupling pin 146 from the slot 144 of the actuating bell crank 128 and locate such pin in a notch 180 in the stationary hanger plate 126, during which time the pin 146 remains in engagement with slot 145 of the transmitting lever 140 and serves to lock the lever in its actuated position.

Near the end of the second cycle of said operation, the shaft 151 is returned counter-clockwise by means of the groove 170 in the cam disc 161, and this again moves the pin 146 to couple the lever 140 and the bell crank 128 together, and the driving cams 120 and 121 restore these parts to their normal positions.

Movement of the total lever 31 back to its normal or add position will move the shaft 151 further counter-clockwise, through the mechanism heretofore described, to uncouple the transmit-

ting lever 146 from the actuating bell crank 128 by withdrawing the pin 146 from engagement with said bell crank, so that they will not be operated during adding operations. It should be noted that in its normal or home position, the pin 146 engages a notch 181 in the hanger plate 126 to hold the transmitting lever 140 against operation.

It can thus be seen that during total or subtotal taking operations the setting of the total lever 31 couples the driving mechanism to the transmitting mechanism, so that upon operation of the machine said mechanism will be operative.

Each single three armed lever 75 cooperates with all the totalizer wheels 33 of like denomination, regardless of the number of such wheels. Therefore, no matter which totalizer line is selected to have a totalizer thereon reset to zero, the levers 75 adjacent their respective denominational actuators 32 will control the latch connection between their respective actuators and corresponding drivers 52.

In the foregoing description of the construction and function of the various parts comprising the invention a complete explanation has been given of the operation of the present machine during both adding and total taking operations, and it is therefore thought unnecessary to include a summary of operation of the machine at this point. Such further description is therefore omitted.

While the form of mechanism herein shown and described is admirably adapted to fulfil the objects primarily stated, it it to be understood that it is not intended to confine the invention to the one form or embodiment herein disclosed, for it is susceptible of embodiment in various forms all coming within the scope of the claims which follow.

What is claimed is:

1. In a machine of the class described, the combination of a totalizer element; a differentially movable actuator to reset said totalizer element to zero; a driver for said actuator; a latch carried by said actuator and normally engaged with said driver to form a driving connection between the driver and said actuator; a two-armed element adapted through one of its arms to disengage said latch from the driver to differentially position the actuator; and means connected to the other arm of said element and adapted to coact with said totalizer element when the latter reaches zero to operate said two-armed element.

2. In a machine of the class described, the combination of a totalizer element; a differentially movable actuator to reset said totalizer element to zero; a driver for said actuator; a latch carried by said actuator and normally engaged with said driver to form a driving connection between the latter and said actuator; a two-armed element adapted through one of its arms to disengage said latch from the driver; a device normally preventing operation of said two-armed element; a control member normally out of cooperative relation with said totalizer element and movable into cooperative relation therewith; a link connecting said control member to one of the arms of said two-armed element; and means for causing said device to release said two-armed element for operation and simultaneously moving said control member into cooperative relation with said totalizer element, the latter upon reaching its zero position moving said member and through said link moving the two-armed element to disengage the latch from said driver whereby the actuator is differentially positioned.

3. In a machine capable of performing adding and total taking operations and having a machine frame, the combination of a totalizer; an actuator therefor; control means whereby the totalizer controls the differential positioning of the actuator during total taking operations, said control means being in an ineffective position during adding operations and movable to an effective position during total taking operations; actuating means to move said control means into effective position, said actuating means being normally uncoupled from the control means; locking means on said frame adjacent the control means when the control means is in effective and ineffective positions; shiftable means connected to the control means and movable into one position to couple the control means to the actuating means for movement thereby, said shiftable means movable to another position to coact with the locking means on the frame to maintain the control means in normal position and in effective position after the control means has been moved into its effective position by the actuating means; and means to selectively move the shiftable means to said one or other position at proper times during a total-taking operation.

4. In a machine capable of performing one cycle adding and multiple cycle total taking operations, the combination of a totalizer; an actuator therefor; a shaft adapted to be rotated to a plurality of positions; a cycle controlling mechanism; a total lever for controlling the machine in adding and total taking operations, said total lever when moved to total taking position rotating said shaft to one of its positions to render the cycle controlling mechanism effective, the latter mechanism being effective to automatically rotate said shaft to another position and return it to its first rotated position during a total taking operation; control means whereby said totalizer can control the differential positioning of the actuator during a total taking operation, said control mechanism being in an ineffective position during adding operations and movable into effective position during total taking operations; actuating means for said control means; and means controlled by said shaft for controlling the operation of said control means by its actuating means, including a member normally locking the control means in its ineffective position and shiftable when the shaft is given its initial movement to unlock the control means and couple the same to said actuating means for movement thereby, and shiftable when the shaft is given its automatic rotation to its other position to uncouple the control means from its actuator and lock the control means in its effective position, said member being shiftable when the shaft is given its automatic return movement to its initially moved position to unlock the control means and couple it to its actuating means for return to its ineffective position.

5. In a cash register, the combination of an accumulating element; a differentially movable actuator for adding items thereon and for resetting said element to zero; a lever adapted when actuated to control the differential positioning of said actuator; a device normally preventing said lever from being actuated; a member operated by said element to actuate said lever but normally out of cooperative relation with said element; a link connecting said mem-

ber with said lever; and means to move said device into a position to release said lever and to simultaneously move said member into position to coact with, and to be actuated by, said element when the latter reaches its zero position on resetting operations.

6. In a cash register, the combination of an accumulating element; a differentially movable actuator for adding items on the accumulating element and for resetting said element to zero; a control member normally out of cooperative relation with said element; a manipulative device for conditioning the machine for resetting operations; actuating means; transmitting means; and adjustable means controlled by said device when the latter is moved to its resetting position to couple said actuating means to said transmitting means to cause the member to be moved into cooperative relation with said element and to uncouple said actuating means from the transmitting means and lock the latter in its actuated position while said element is being returned to its zero position when the latter will actuate said member to control the differential positioning of the actuator, said adjustable means being operable to again couple said actuating means to said transmitting means to restore the latter to its normal position during the latter part of the operation.

7. In a machine of the class described, the combination of a totalizer element; a differentially movable actuator to reset said totalizer element to zero; a driver for said actuator; a latch carried by said actuator and normally engaged with said driver to form a driving connection between the driver and the actuator; means on said latch; a two-armed lever having one of its arms normally out of engagement with the means on the latch but movable into engagement with the means on the latch to disengage the latch from the driver; means for retaining said lever in its normal position; a control element normally out of engagement with said totalizer element but movable into a position where it will be shifted by the totalizer element when the element is reset to zero; a link connecting said lever and said control element; means to move the link in one direction, when the lever is retained in its normal position, to thereby move the control element into position to cooperate with the totalizer element; and means to remove said retaining means, after the control element has been moved, to enable the control element to move the link in another direction to shift the lever and disengage the latch as the control element is shifted by the totalizer element when the totalizer element is reset to zero.

8. In a machine capable of performing adding and total-taking operations and having a machine frame, the combination of a totalizer; an actuator therefor; control means whereby the totalizer controls the differential positioning of the actuator during total-taking operations, said control means being in an ineffective position during adding operations and movable to an effective position during total-taking operations; actuating means for moving said control means into effective position and back to normal position, said actuating means being normally uncoupled from said control means; shiftable means for locking said control means in normal and also in effective position and, when shifted, coupling the control means to its actuating means; and means for selectively shifting the shiftable means to lock and unlock the control means at proper times during the total-taking operation and to couple the control means to its actuating means whenever the control means is unlocked.

9. In a machine capable of performing adding and total-taking operations and having a machine frame, the combination of a totalizer; an actuator therefor; control means whereby the totalizer controls the differential positioning of the actuator during total-taking operations, said control means being in an ineffective position during adding operations and movable to an effective position during total-taking operations; actuating means for moving said control means into effective position and back to normal position, said actuating means being normally uncoupled from said control means; shiftable means for locking said control means in normal and also in effective position and, when shifted, coupling the control means to its adjusting means; and means for shifting the shiftable means during a total-taking operation to first unlock the control means in normal position, and couple the actuating means to the control means, then shifting the shiftable means to uncouple the control means and lock the control means in effective position, then shifting the shiftable means to unlock the control means in effective position and couple the control means to its actuating means, and finally shifting the shiftable means to uncouple the control means from its actuating means and lock the control means in normal position.

10. In a machine of the class described, the combination of a totalizer element; an actuator movable different extents to enter items into and to reset said totalizer element; a driver for said actuator; latch mechanism carried by said actuator and normally engaged with the driver to form a driving connection between the actuator and the driver; a two-armed lever pivotally mounted adjacent said actuator, one arm of said lever being engageable with the latch mechanism and extending throughout the extent of differential movement of the actuator, said arm engaging the latch mechanism when the lever is pivoted, to thereby operate the latch mechanism to disconnect the actuator from the driver after different extents of movement of the actuator; a control member cooperable with the totalizer element and operated thereby in a resetting operation when the totalizer element reaches zero position; and means connecting said control member to the other arm of said two-armed lever; said control member, through the connecting means, pivoting said two-armed lever when the control member is operated by the totalizer element so that said one arm on the lever engages the latch mechanism and disconnects the actuator from the driver under control of the totalizer element.

WILLIS E. EICKMAN.