Jan. 27, 1953 R. A. CHRISTIAN ET AL 2,626,750

CARRIAGE OPERATED CONTROLLING MECHANISM FOR ACCOUNTING MACHINES

Filed June 27, 1951 2 SHEETS—SHEET 1

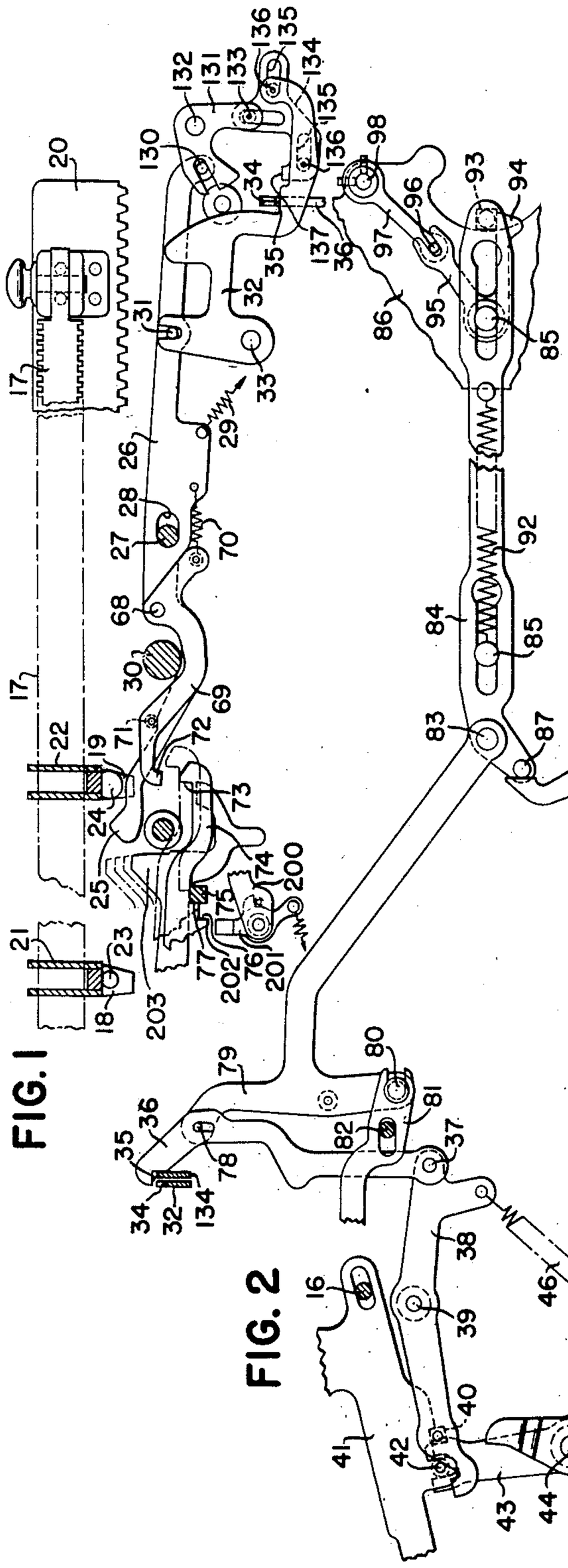

FIG. 1

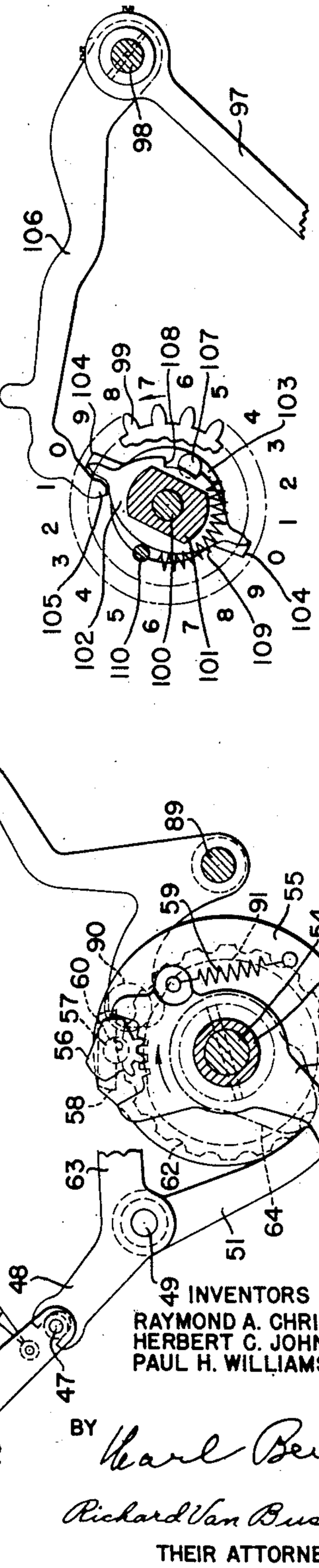

FIG. 3

FIG. 2

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2 SHEETS—SHEET 2

FIG. 4

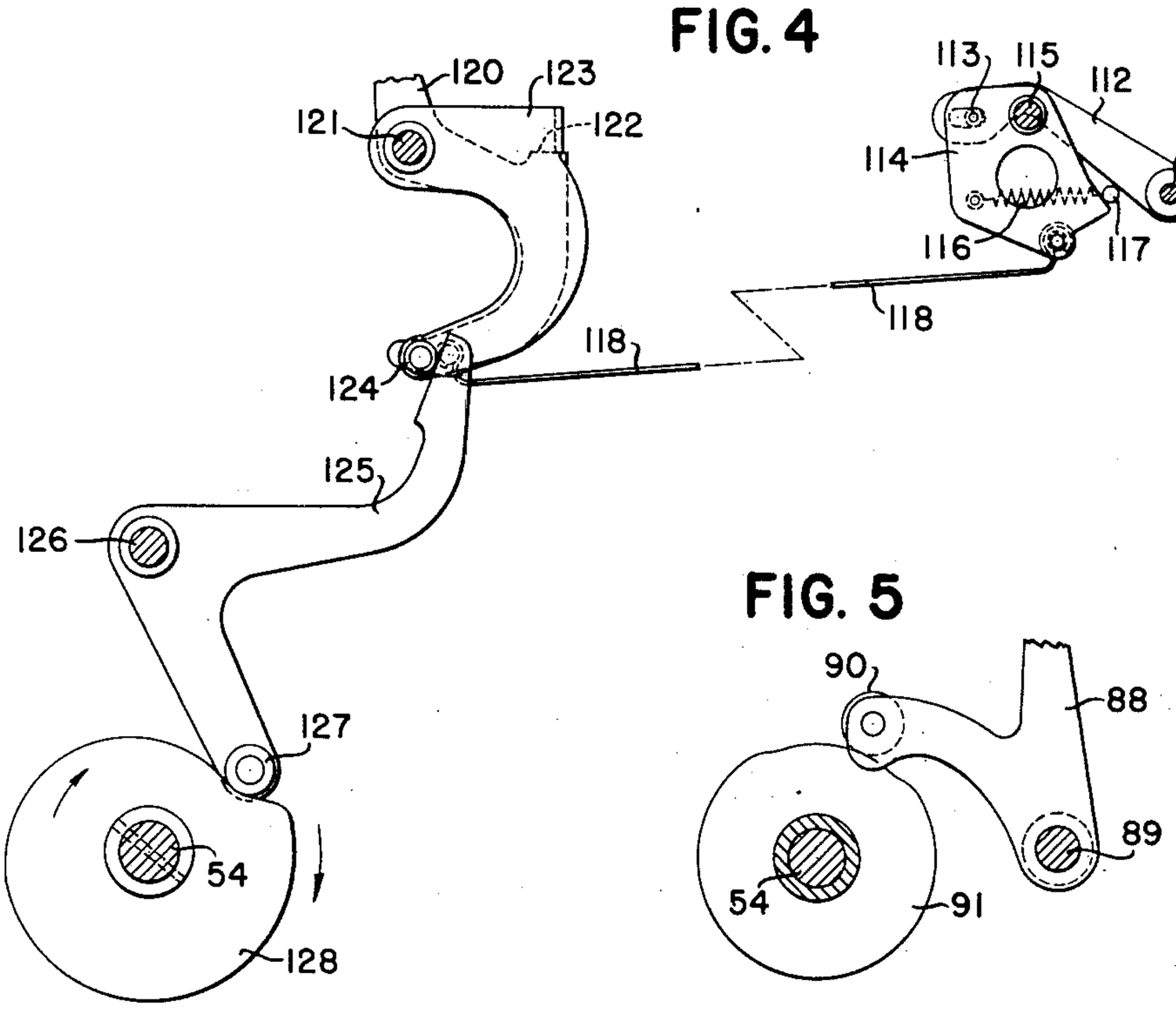
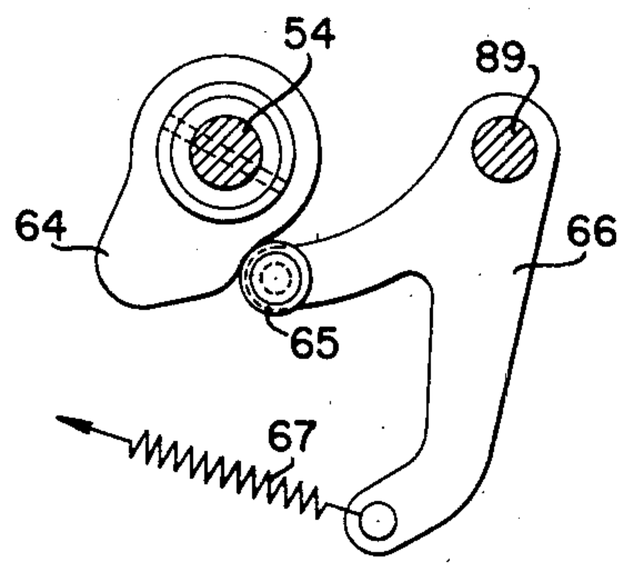


FIG. 5

FIG. 6



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CARRIAGE OPERATED CONTROLLING MECHANISM FOR ACCOUNTING MACHINES

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Application June 27, 1951, Serial No. 233,868

7 Claims. (Cl. 235—60.49)

1

The present invention relates to accounting machines and is particularly directed to the controlling mechanisms of such machines.

One object of the present invention is the provision of an improved mechanism for effecting an automatic operation of the machine.

Another object is to provide an improved mechanism for controlling the functioning of the automatic operating mechanism in overdraft operations.

A further object is the provision of an improved sensing mechanism for rendering the overdraft control mechanism effective.

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

In the drawings:

Fig. 1 is a detail view in front elevation of a portion of the mechanism controlled by the traveling carriage for initiating automatic operations of the machine.

Fig. 2 is a detail view, in side elevation, of additional mechanism for initiating and controlling automatic operations of the machine.

Fig. 3 is an enlarged detail view of the sensing mechanism for the overdraft control mechanism.

Fig. 4 is a detail view, in side elevation, of the operating mechanism for the sensing mechanism shown in Fig. 3.

Fig. 5 is a detail view of the cam and lever for operating the overdraft sensing mechanism.

Fig. 6 is a detail view of the homing cam and lever for the main shaft.

Description

The present invention may preferably be incorporated in a machine of the type disclosed in the co-pending application of Raymond A. Christian et al., Serial Number 790,032, filed December 6, 1947, for Accounting Machines, to which reference may be had for a complete description of mechanism not pertinent to the present invention and therefore not described in detail in the present application.

The machine chosen to illustrate the present invention has a laterally-movable traveling carriage with a stop bar 17 removably mounted on the front surface of an escapement rack 20 secured to the framework of said carriage. The bar 17 is arranged to adjustably support function control stops 21 and 22 in predetermined columnar positions along its length. The stops 21 and 22 have depending forward tabulating

2

stop lugs 18 and 19, respectively, said lug 18 having secured therein the tenon of a small-diameter stud 23, and said lug 19 having secured therein the tenon of a large-diameter stud 24. The studs 23 and 24 are arranged to coact with a rounded nose 25 on a control lever 26, as will be explained later, for initiating automatic operating cycles of the machine. It will be noted that the lever 26 has a slot 28, which engages a stationary stud 27, to shiftably and pivotally mount said lever. A spring 29 is tensioned to urge the lever 26 toward the right (Fig. 1) and clockwise to normally maintain said lever in its right-hand position, as shown here, and in yielding contact with a stop rod 30 supported by the framework of the machine.

The lever 26 carries a stud 31, which engages a slot in an upward extension of a lever 32 pivotally supported by a stud 33 secured in the machine framework. The lever 32 has a shoulder 34, which coacts with a flat surface 35 (Figs. 1 and 2) on the upper end of a hook 36 pivoted at its lower end on a stud 37 in the rear end of a lever 38 in turn pivoted on a stud 39 secured in the machine framework. A spring 46 urges the lever 38 clockwise to normally maintain a square stud 40, carried thereby, in engagement with a shoulder on a machine release slide 41 shiftably mounted by means of two slots therein, in cooperation with stationary studs 16 secured in the machine framework, only one of said slots and said studs being shown herein. The slide 41 carries a stud 42, which engages a slot in the upper end of a crank 43 secured on a short shaft 44 journaled in the machine framework. Also secured on the shaft 44 is an arm 45 carrying a stud 47, which engages a slot in a forward extension of an arm 48 secured on a short shaft 49 journaled in the machine framework. A comparatively strong spring 50 (Fig. 2), one end of which is connected to the arm 45, urges said arm counter-clockwise and, through the crank 43, urges the slide 41 forwardly to normally maintain the shoulder on said slide in yielding engagement with the square stud 40, which stud normally obstructs such forward movement of said slide.

When forward movement of the slide 41 (Fig. 2) is obstructed by the stud 40, a tripping arm 51, secured on the shaft 49, is maintained in the path of a downward extension of a clutch control arm 52 free on a hub 53 carried by a disk 55, said hub being secured on a main cam shaft 54 journaled in the framework of the machine. The arm 52 has gear teeth in its upper portion, which mesh with corresponding gear teeth in a headed portion 56 of a clutch engaging stud or dog 57 jour-

naled in a bushing 58 carried by the disk 55. A spring 59, tensioned between the arm 52 and the disk 55, urges said arm clockwise to normally maintain a downward extension thereof in yielding contact with the arm 51, as shown here. When the arm 52 and the dog 57 (Fig. 2) are maintained in untripped positions, as shown here, a cut-away flat portion 60 of said dog is positioned so as to provide operating clearance for the periphery of a driving disk 61 free on the main shaft 54 and continuously rotated clockwise through a train of gearing which connects said disk to the main power source for operating the machine, in this case an electric motor, not shown.

Under certain conditions, when the traveling carriage arrives at predetermined columnar positions, mechanism, to be described presently, lifts the hook 36 (Figs. 1 and 2) to rock the lever 38 counter-clockwise, against the action of the spring 46, to disengage the stud 40 from the shoulder in the slide 41. This releases said slide 41 and connected mechanism to the action of the spring 50, which immediately rocks the arm 48, the shaft 49, and the tripping arm 51 clockwise, to disengage the lower end of said tripping arm from the extension of the clutch control arm 52, to free said latter arm to the action of the spring 59. The spring 59 immediately rocks the arm 52 clockwise, said arm in turn rocking the dog 57 counter-clockwise in unison therewith to engage the flat portion 60 of said dog with one of a series of uniformly-spaced notches 62 in the periphery of the disk 61, to operatively connect said disk 61 to the disk 55. The disk 61, which is continuously revolved clockwise by the operating motor, immediately picks up the disk 55 and the main cam shaft 54 and revolves them in unison therewith.

When the disk 55 and the main shaft 54 near the end of a complete clockwise revolution, a restoring cam (not shown), secured to said shaft 54, engages a roller on an extension 63 of the arm 48 and restores said arm counter-clockwise against the action of the spring 50 to move the tripping arm 51 into the path of the control arm 52 and to simultaneously restore the tripping slide 41 rearwardly, where its shoulder is again engaged by the stud 40, which retains said slide and connected parts in restored condition, as shown in Fig. 2. The tripping arm 51 obstructs further clockwise movement of the arm 52, whereupon continued independent rotation of the disk 55 causes the dog 57 to be restored clockwise to disengaged position, as shown here, to disconnect said disk 55 from the driving disk 61 to terminate machine operation, which normally requires one uninterrupted clockwise revolution of the main shaft 54, except in the case of overdraft operations, which require two such revolutions.

Secured on the main cam shaft 54 is a homing cam 64 (Figs. 2 and 6), which cooperates with a roller 65 mounted on an arm 66 free on a stud 39 fast in the machine framework, said roller being maintained in yielding contact with the periphery of said cam 64 by a comparatively strong spring 67, which urges said arm 66 clockwise. The roller 65, cooperating with the cam 64, assists the main shaft 54 to home position, after the clutch has been disengaged, as explained above, and a notch in the periphery of said cam 64, cooperating with said roller in home position, yieldingly maintains said shaft in home position, as shown here.

Referring to Fig. 1, the lever 26 carries a stud 68, which pivotally supports a hook 69, urged counter-clockwise by a spring 70, to normally maintain a stud 71, carried by said hook, in yielding contact with a shoulder formed on the upper surface of said lever 26. A downward extension 72 of the hook 69 is arranged to cooperate with a shoulder 73 on a tabulating control lever 74, only the right-hand end of which is shown here, said lever 74 being mounted in a similar manner to the lever 26 by means of a slot therein, which engages a stationary stud. A spring (not shown), which functions similarly to the spring 29, urges said lever 74 clockwise and toward the right to normally maintain said lever in its home position, as shown here in full lines, in which position an upper right-hand notch 77, cut in its lower surface, engages a square stationary stud 75. When the lever 74 is in home position, as shown here, the shoulder 73 is maintained out of coacting relationship with the downward extension 72 of the hook 69. The traveling carriage is released for tabulating movement by counter-clockwise movement of the lever 74, which movement is effected by clockwise movement of a tabulating control lever 200 (Fig. 1). Clockwise movement of the lever 200 causes a lifting pawl 201, mounted thereon, to engage a downward projection 202 on the lever 74 to rock said lever upwardly or counter-clockwise against the action of its spring. Upward movement of the lever 74 disengages the notch 77 from the stud 75, whereupon said lever is immediately shifted toward the right by its spring to engage a lower left-hand notch 76 therein with the stud 75 to maintain said lever 74 in its effective position, as shown here in dot-and-dash lines.

When the traveling carriage arrives in a columnar position in which one of the studs 23 or 24 engages the nose 25, the lever 26 is rocked counter-clockwise or depressed against the action of its spring 29, to move the extension 72 into the path of the shoulder 73. Simultaneously with the depression of the lever 26, the tabulating stop lug 18 or 19 engages an abutment arm 203, operatively connected to the lever 74, in the manner fully disclosed in the co-pending application Serial Number 790,032, and shifts said abutment arm and the lever 74 toward the left to terminate tabulating movement of the traveling carriage and to cause the shoulder 73, in cooperation with the extension 72, to shift the hook 69 and the lever 26 toward the left in unison therewith against the action of the spring 29. Left-hand shifting movement of the lever 26 causes the stud 31, in cooperation with the slot in the lever 32, to rock said lever counter-clockwise on its pivot stud 33, whereupon the shoulder 34, in cooperation with the surface 35, lifts the hook 36 to render the clutch mechanism effective, as explained before, to initiate an automatic operation of the machine, under control of the traveling carriage in predetermined columnar positions thereof.

Left-hand movement of the lever 74 moves the lower notch 76 in said lever beyond the stud 75, whereupon said lever is spring-returned clockwise or downwardly to engage the upper notch 77 with said stud to restore said lever to its normal position, as shown in full lines in Fig. 1. This restoration of the lever 74 disengages the shoulder 73 from the extension 72, whereupon the spring 29 restores the lever 26 and connected parts toward the right to normal positions, as shown here.

Means is provided for rendering the automatic machine-releasing mechanism ineffective when a selected totalizer is in an overdrawn condition, to apprise the operator of this fact.

Mechanism which is controlled by the highest order wheel of a totalizer, when it moves one step from zero in a subtractive direction—that is, when the capacity of the totalizer is exceeded—rocks the surface 35 (Fig. 2) on the hook 36 out of the path of the shoulder 34, so that operation of the levers 26 and 32, in the manner explained above, will not shift said hook 36 upwardly to release the machine for an automatic operation.

Directing attention to Fig. 2, the upper end of the hook 36 has a vertical slot, which engages a stud 78 in an upward extension of a link 79, a downward extension of which has a stud 80, which engages a horizontal slot in the rear end of a bar 81 mounted for horizontal sliding movement by means of parallel slots therein, in cooperation with fixed studs 82, only one of said slots and one of said studs being shown herein. The rear end of the link 79 is pivotally connected to a stud 83 in the forward end of a slide bar 84 mounted to shift horizontally by means of parallel slots therein in cooperation with studs 85 secured in the totalizer framework 86. Secured in the forward end of the bar 84 (Fig. 2) is a stud 87, which cooperates with a foot-shaped upper extension of a lever 88 pivotally mounted on the stud 89. A forward extension of the lever 88 carries a roller 90 (see also Fig. 5), which cooperates with the periphery of a plate cam 91 secured to the main shaft 54.

In the beginning of machine operation, rotation of the cam 91, through the roller 90, rocks the lever 88 clockwise to shift the slide bar 84 rearwardly against the tension of a spring 92, to move a square stud 93 in the rearward end of said slide bar beyond the end of a blocking finger 94 pivotally mounted on the rearward stud 85. The finger 94 has an upward extension 95, bifurcated to receive a stud 96 in the lower end of a crank 97 secured on an overdraft control shaft 98 for an upper totalizer comprising a plurality of denominational order totalizer wheels 99.

Only the highest order totalizer wheel 99 is shown in Fig. 3, and this wheel will be described as representative of all of the totalizer wheels.

Each wheel 99 is secured to a hub 101 free on a totalizer shaft 100, which is rockably supported in the totalizer framework 86. Each of the totalizer wheels 99 has two sets of ten teeth each, which are engageable with corresponding sets of teeth on the denominational actuator racks, not shown, for the purpose of entering values into the totalizer and for taking values out of said totalizer. Secured to the hub 101, in fixed relationship to the wheel 99, is a transfer tripping cam 102, having diametrically opposed tripping teeth, which cooperate with the corresponding add and subtract transfer tripping pawls.

In all denominational orders, except the highest order, the diametrically-opposed tripping teeth on the cams 102 cooperate with the add and subtract tripping pawls in adding and subtracting operations to transfer tens values, in the usual manner. The tripping teeth also cooperate with the corresponding add-transfer pawls in total and sub-total taking operations to stop the totalizer wheels in zero position to position the corresponding amount actuators and printing sectors in accordance with the values standing on said wheels. The highest order wheel 99, shown in Fig. 3, has no provision for transferring amounts to higher orders, but the diametrically-opposed tripping teeth on its cam 102 cooperate with the corresponding add-transfer pawl in total and sub-total taking operations for locating said highest order wheel 99 in zero position, in such operations. Rotatably supported on a left-hand extension of the hub 101 is an overdraft shaft sensing cam 103, having diametrically-opposed stop teeth 104, which cooperate with a downwardly-extending tip 105 on a sensing finger 106 secured on the overdraft shaft 98.

Due to certain conditions which may occur, as will be explained later, it is necessary for the sensing cam 103 to be flexibly mounted so that it can move relatively to the totalizer wheel 99 and the tripping cam 102. This is accomplished by means of a stud 107 secured in said cam 103 and having a cut-away or flat surface which rides in a notch 108 cut in the periphery of the tripping cam 102. A spring 109, tensioned between said stud 107 and a stud 110 secured in the wheel 99, urges said sensing cam 103 clockwise to normally maintain the stud 107 in engagement with the downward wall of the notch 108, so that said cam 103 is free to yield in a counter-clockwise direction but is normally maintained in its home or normal position, as shown in Fig. 3.

Secured on the overdraft shaft 98 (Fig. 4) is an arm 112 having a slot in its forward end which engages a stud 113 secured in a plate 114 pivoted on a stud 115 secured in the machine framework. A spring 116 urges the plate 114 counter-clockwise to normally maintain a rearward surface on said plate in yielding contact with a stop stud 117 secured in the machine framework. A wire link 118 pivotally connects the plate 114 to a corresponding operating lever 120 pivotally supported between the side arms of a yoke 123 on a stud 121 secured in the framework of the machine, which stud also serves to pivotally support said yoke 123. A raised surface 122 on the lever 120 is normally maintained in yielding contact with the bottom surface of the bail of the yoke 123, by the spring 116. The left arm of the yoke 123 has a downward extension supporting a roller 124, which coacts with the camming surface on an upward extension of a lever 125 rotatably supported on a shaft 126 journaled in the machine framework. A downward extension of the lever 125 carries a roller 127, which cooperates with the periphery of a plate cam 128 secured on the main shaft 54.

The cam 128 and the shaft 54 make one clockwise revolution each machine operation, causing the periphery of said cam, in cooperation with the roller 127, to gradually rock said lever 125 counter-clockwise from the position shown here to its fully-moved position, during 210 degrees of movement of said cam 128. After this, the lever dwells in its moved position until the cam 128 and the shaft 54 have completed 335 degrees of movement, after which said cam quickly restores said lever to its clockwise position, as shown here. The cam 91 (Figs. 2 and 5), during the first 60 degrees of its movement, rocks the lever 88 clockwise. Clockwise initial movement of the lever 88 shifts the slide bar 84 rearwardly to move the stud 93 beyond the end of the finger 94 and to simultaneously move the surface 35 on the hook 36 out of the path of the shoulder 34 on the

lever 32 (see also Fig. 1). After the slide bar 84 has been moved to its rearward position, initial counter-clockwise movement of the lever 125 (Fig. 4), as explained above, rocks the yoke 123 clockwise, and the bail of said yoke, in cooperation with the surface 122, carries the lever 120 clockwise in unison therewith. Clockwise movement of the lever 120, through the link 118, rocks the plate 114 also clockwise, causing the stud 113, coacting with the slot in the forward end of the arm 112, to rock said arm, the overdraft shaft 98, the sensing finger 106, and the crank 97 (Figs. 2 and 3) clockwise in unison therewith to move the tip 105 of said finger 106 above the stop teeth 104 on the cam 103.

Clockwise movement of the crank 97 rocks the finger 94 counter-clockwise from the position shown in Fig. 2 into the path of the stud 93, which, as explained above, is now held in its rearward position. While the finger 106 is in its raised or clockwise position, actuation of the totalizer takes place, and, if during this actuation the highest order wheel 99 (Fig. 3) is moved one step in a reverse direction from zero position, as shown here, to 9 position, thus indicating that the totalizer is overdrawn, the tooth 104 will be moved into the path of the tip 105 of said finger 106.

Near the end of machine operation, after the cam 91 (Fig. 5) has completed 320 degrees of movement, a declining surface on said cam permits the spring 92 to return the slide bar 84 and the lever 88 forwardly and counterclockwise, respectively, until such forward movement of said slide is terminated by the square stud 93 contacting the end of the finger 94. Approximately concurrently with return movement of the slide bar 84, 335 degrees of rotation of the cam 128 (Fig. 4) brings a declining surface thereon opposite the roller 127, thus permitting the spring 116 to restore the plate 114 counter-clockwise, and said plate in turn simultaneously restores the arm 112, the shaft 98, the finger 106, and the crank 97 also counter-clockwise in unison therewith.

If the totalizer is not in an overdrawn condition, the proper one of the teeth 104 will remain out of the path of the tip 105 of the finger 106, and thus said finger and connected parts will be free to return fully to their normal positions, as shown here. This causes the crank 97 to rock the finger 94 clockwise out of the path of the stud 93, to permit the slide bar 84 to return forwardly under influence of the cam 91, to move the surface 35 on the hook 36 back into the path of the shoulder 34. If the totalizer is in an overdrawn condition, the tooth 104 will be positioned in the path of the tip 105, as explained above, and consequently return counter-clockwise movement of the finger 106, the shaft 98, and the crank 97 will be obstructed. In this case, the crank 97 will retain the finger 94 in the path of the stud 93, and, as a result, the slide bar 84 will be retained in its rearward position, thus holding the surface 35 out of the path of the shoulder 34. Under these conditions, the small diameter stud 23 (Fig. 1) on the stop 21, coacting with the nose 25, will rock the lever 26 counter-clockwise to move the extension 72 into the path of the shoulder 73, whereupon termination of the tabulating movement of the traveling carriage will shift the levers 74 and 26 toward the left to rock the lever 32 counter-clockwise, in the manner explained before. However, inasmuch as the surface 35 of the hook 36 is out of the path of the shoulder 34 on the lever 32, counter-clockwise movement of said lever will have no effect upon said hook, and consequently in this case there will be no automatic operation of the machine when the totalizer is in an overdrawn condition.

In certain business systems to which the present machine is adaptable, it is desirable that automatic operations of the machine may be initiated by the traveling carriage in predetermined columnar positions thereof, regardless of whether or not the selected totalizer is in an overdrawn condition. This is effected by the large diameter stud 24 on the stop 22 (Fig. 1), which, in cooperation with the nose 25, rocks the lever 26 a greater extent counter-clockwise than the stud 23, which greater movement not only moves the extension 72 into the path of the shoulder 73 but simultaneously conditions the machine for an automatic operation under influence of the traveling carriage, as will now be explained.

The lever 26 has in its right-hand end a stud 130, which engages a camming slot in a left-hand extension of a bell crank 131 free on a stud 132 secured in the machine framework. A downward extension of the bell crank 131 carries a stud 133, which engages a vertical slot in a plate 134 slidably mounted on a right-hand extension of the lever 32 by means of parallel slots 135 in said plate 134, in cooperation with corresponding studs 136 secured in said lever 32. Full counter-clockwise movement of the lever 26, under influence of the large diameter stud 24, causes the stud 130, in cooperation with the slot in the bell crank 131, to rock said bell crank its extreme extent of movement in a clockwise direction to cause the stud 133, in cooperation with the slot in the plate 134, to shift said plate toward the left to move an upwardly-projecting shoulder 137 thereon beneath the surface 35 of the hook 36, which surface, as previously explained, is retained out of the path of the shoulder 34 in overdraft operations but remains in the vertical path of the shoulder 137. Counterclockwise movement of the lever 26 moves the extension 72 of the hook 69 into the path of the shoulder 73, whereupon termination of tabulating movement of the traveling carriage shifts the levers 26 and 74 toward the left. This movement of the lever 26, through the stud 31, rocks the lever 32 counter-clockwise, causing the shoulder 137, in cooperation with the surface 35, to lift the hook 36, in the manner explained previously, to initiate an automatic operation of the machine.

In other words, when the totalizer is in an overdrawn condition, the surface 35 on the hook 36 is retained out of the operating range of the shoulder 34 on the lever 32. However, said surface remains in the vertical operating range of the shoulder 137, and full left-hand shifting movement of the plate 134, under influence of the large diameter stud 24, moves the shoulder 137 into coacting relationship with said surface to effect an automatic operation of the machine.

From the foregoing description, it should be apparent that, when the totalizer is not in an overdrawn condition, either of the studs 23 or 24 will initiate an automatic operation of the machine, under control of the traveling carriage in predetermined columnar positions thereof. In such operations, the larger diameter stud 24 shifts the shoulder 137 into the path of the surface 35, the same as in overdraft operations. However, this is of no particular significance, as said sur-

face 35 is also in the path of the shoulder 34, which, in this case, is effective to lift the hook 36 to initiate an automatic machine operation. Likewise it should be apparent that in overdraft operations the smaller diameter stud 23 (Fig. 1) is ineffective to initiate an automatic machine operation. However, if such automatic operation is required, it may be effected by locating one of the large diameter studs 24 in relation to the proper columnar position of the traveling carriage.

Directing attention to Fig. 2, the bar 81 is operatively connected at its forward end to a Non-Automatic key (not shown but fully disclosed in the co-pending application Serial Number 790,032), depression of which key shifts said bar 81 rearwardly. Rearward movement of the bar 81, through the link 79, rocks the hook 36 clockwise a sufficient distance to move the surface 35 thereon out of the path of the shoulders 34 and 137 on the members 32 and 134, to disable the automatic operating mechanism at all times, when said Non-Automatic key is depressed.

The reason for the flexible mounting of the sensing cam 103 (Fig. 3) is that, under certain conditions in adding operations, it is possible that the transfer of a tens digit to the highest order will be delayed a sufficient length of time to permit the finger 106 to be restored counter-clockwise to normal position, as shown here, before such transfer takes place, and this is especially true when the transfer extends through several lower orders to the highest order. For example, assuming that the highest order wheel 99 is standing in "8" position and all the lower order wheels are standing at "9," the entering of a digit in the units order will cause a transfer to take place progressively through all the orders, including the highest order. In this case, there is sufficient lag or delay in the transferring movement of the highest order wheel to permit the finger 106 to be restored counter-clockwise to normal position, as shown in Fig. 3, before such movement takes place. Under this condition, the tip 105 of said finger will be in the path of the tooth 104 and normally would obstruct transfer movement of said wheel 99 from "8" position to "9" position in an additive or clockwise direction. However, the flexible construction of the cam 103 permits the wheel 99 to move independently thereof the equivalent of one tooth space or one digit, from "8" position to "9" position. In the immediately succeeding operation, clockwise movement of the finger 106 moves the tip 105 out of the path of the teeth 104, to permit the cam 103 to be restored by the spring 109 clockwise to normal position, as shown in Fig. 3.

In the present adaptation, the mechanism for controlling automatic machine operations when the selected totalizer is overdrawn is shown in connection with only one totalizer. However, this feature is not limited to one or to any particular number of totalizers and therefore may be incorporated in as many totalizers as desired.

While the form of mechanism herein shown and described is admirably adapted to fulfill the objects primarily stated, it is 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 other forms.

What is claimed is:

1. In a machine of the class described, having a traveling carriage mounted thereon for tabulating movement and having an add-subtract totalizer, the combination of a device to operate the machine; means to drive the machine operating device; normally ineffective means to connect the machine operating device to the driving means; means including a releasable latch to render the connecting means effective; an element connected to the releasable latch; means controlled by the carriage in predetermined columnar positions and coacting with the element to release the latch to render the connecting means effective; means effective each machine operation to move the element out of coacting relationship with the means controlled by the carriage and back into coacting relationship with said means; means controlled by the add-subtract totalizer when overdrawn to retain the element out of coacting relationship with the means controlled by the carriage; and means including a slide operatively connected to the means controlled by the carriage, said slide movable by said means controlled by the carriage when said carriage is tabulated to certain of said predetermined columnar positions into coacting relationship with the element to cause said element to release the latch to render the connecting means effective.

2. In a machine of the class described, having a traveling carriage mounted thereon for tabulating movement and having an add-subtract totalizer, the combination of a device to operate the machine; means to drive the device; a clutch to connect the driving means to the operating device; means including a spring-loaded slide to control the clutch; means including a latch normally effective to hold the slide against spring action to retain the clutch disengaged; a movable element connected to the latch; means controlled by the carriage in predetermined columnar positions thereof and coacting with the element to render the latch ineffective to cause the clutch to be engaged to initiate machine operation; means effective each machine operation to move the element out of coacting relationship with the means controlled by the carriage and back into coacting relationship therewith; means controlled by the add-subtract totalizer when in an overdrawn condition to obstruct return movement of the element into coacting relationship with the means controlled by the carriage; and means operatively connected to the means controlled by the carriage and movable thereby when the carriage is tabulated to certain of said predetermined columnar positions into coacting relationship with the element to render the clutch effective to initiate operation of the machine when the add-subtract totalizer is in an overdrawn condition.

3. In a machine of the class described, having a traveling carriage mounted thereon for tabulating movement and having an add-subtract totalizer, the combination of means to release the machine for operation; means operated by the traveling carriage in predetermined columnar positions thereof to actuate the machine releasing means; means including a member rockably and shiftably mounted on the machine and constructed and arranged to be rocked by the carriage when in said predetermined columnar positions into coacting relationship with the actuating means to be shifted thereby; an operating element connected to the releasing means; a part operatively connected to the member and coacting with the element and effective upon shifting of said member to cause said element

to operate the releasing means; means to move the element out of and back into coacting relationship with the part during each machine operation; means controlled by the add-subtract totalizer when overdrawn to retain the element out of coacting relationship with the part to render the releasing means ineffective; and means mounted on the part and movable by rocking movement of the member, when the traveling carriage is tabulated to certain of said predetermined columnar positions, into coacting relationship with the element to cause said element to operate the releasing means to initiate an automatic operation of the machine when the totalizer is in an overdrawn condition.

4. In a machine of the class described having a traveling carriage mounted thereon for tabulating movement and having an add-subtract totalizer, the combination of means to release the machine for operation; means including an element for operating the releasing means; a member rockably and shiftably mounted on the machine; means operated by the carriage in predetermined columnar positions thereof to shift the member; means operated by the carriage in said predetermined columnar positions to rock the member into coacting relationship with the shifting means; a part operatively connected to the member and coacting with the element upon shifting movement of said member to cause said member to operate the releasing means to initiate an automatic machine operation; means effective each machine operation to move the element out of and back into coacting relationship with said part; means rendered effective by the add-subtract totalizer when overdrawn to retain the element out of coacting relationship with the part to prevent automatic machine operation; a slide shiftably mounted on the part for movement into and out of coacting relationship with the element, but normally out of coacting relationship therewith; and means whereby rocking movement of the member, when the carriage is tabulated to certain of said predetermined columnar positions, shifts the slide into coacting relationship with the element, whereupon shifting movement of said member causes said slide to coact with the element to release the machine for an automatic operation, when the totalizer is overdrawn.

5. In a machine of the class described, having a traveling carriage mounted thereon for tabulating movement, and having an add-subtract totalizer, the combination of spring-actuated means to release the machine for operation; a latch normally effective to retain the releasing means against releasing movement; a latch-operating element connected to the latch; a member mounted for rocking and shifting movement on the machine; means to shift the member, said member normally out of coacting relationship with said shifting means; means on the carriage to impart two different extents of rocking movement to the member, either of which is effective to move said member into coacting relationship with the shifting means; a part operatively connected to the member and coacting with the element upon shifting movement of said member to render the latch ineffective to free the releasing means for releasing movement; means to move the element out of and into coacting relationship with the part each machine operation; means operated by the add-subtract totalizer when in an overdrawn condition to retain the element out of coacting relationship with the part to prevent

automatic release of the machine; and means mounted on the part and movable by the member, when it receives a certain one of its two extents of rocking movement, into coacting relationship with the element to effect automatic release of the machine for operation when the totalizer is in an overdrawn condition.

6. In a machine of the class described, having a traveling carriage mounted thereon for tabulating movement to various columnar positions and having an add-subtract totalizer, the combination of means to release the machine for operation; yieldable means to actuate the releasing means; a latch normally effective to retain the releasing means against the action of the yieldable means; a latch-operating element connected to the latch; a member mounted for rocking and shifting movement; means to shift the member, said member normally out of coacting relationship with said shifting means; a first means located in a particular columnar position on the traveling carriage and coacting with the member to rock it a certain extent into coacting relationship with the shifting means, said first means also effective to actuate said shifting means; a second means located in another columnar position on the traveling carriage and coacting with the member to rock it another extent into coacting relationship with the shifting means, said second means also effective to actuate said shifting means; a part operatively connected to the member and coacting with the element upon shifting movement of said member to disengage the latch from the releasing means to initiate an automatic machine operation; means to move the element out of and into coacting relationship with the part each machine operation; and means mounted on the part and movable by the member, when it is rocked by the second means, into coacting relationship with the element to effect an automatic operation of the machine when the add-subtract totalizer is in an overdrawn condition.

7. In a machine of the class described, having a traveling carriage mounted thereon for tabulating movement to various columnar positions, and having an add-subtract totalizer, the combination of a main operating mechanism for the machine; a power source, a clutch mechanism operative to connect the power source to the main operating mechanism to cause the machine to perform cycles of operation; clutch control means; yieldable means to actuate the clutch control means; a latch normally effective to hold the clutch control means against the action of the yieldable means to cause said clutch control means to maintain the clutch inoperative; a latch operating element connected to the latch; a member mounted for rocking and shifting movement on the machine; means to shift the member, said member normally out of coacting relationship with said shifting means; a first means located in a particular columnar position on the traveling carriage and coacting with the member to rock it a certain extent into coacting relationship with the shifting means, said first means also effective to actuate said shifting means; a second means located in another columnar position on the traveling carriage and coacting with the member to rock it another extent into coacting relationship with the shifting means, said second means also effective to actuate said shifting means; a part operatively connected to the member and coacting with the element upon shifting movement of said mem-

ber to disengage the latch from the clutch control means to render the clutch mechanism operative to cause the machine to perform an automatic cycle of operation; means to move the element out of and into coacting relationship with the part each machine operation; means operated by the add-subtract totalizer when in an overdrawn condition to retain the element out of coacting relationship with the part to prevent an automatic cycle of operation; and means mounted on the part and movable by the member, when it is rocked by the second means, into coacting relationship with the element to effect an automatic cycle of operation, when the add-subtract totalizer is in an overdrawn condition.

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