

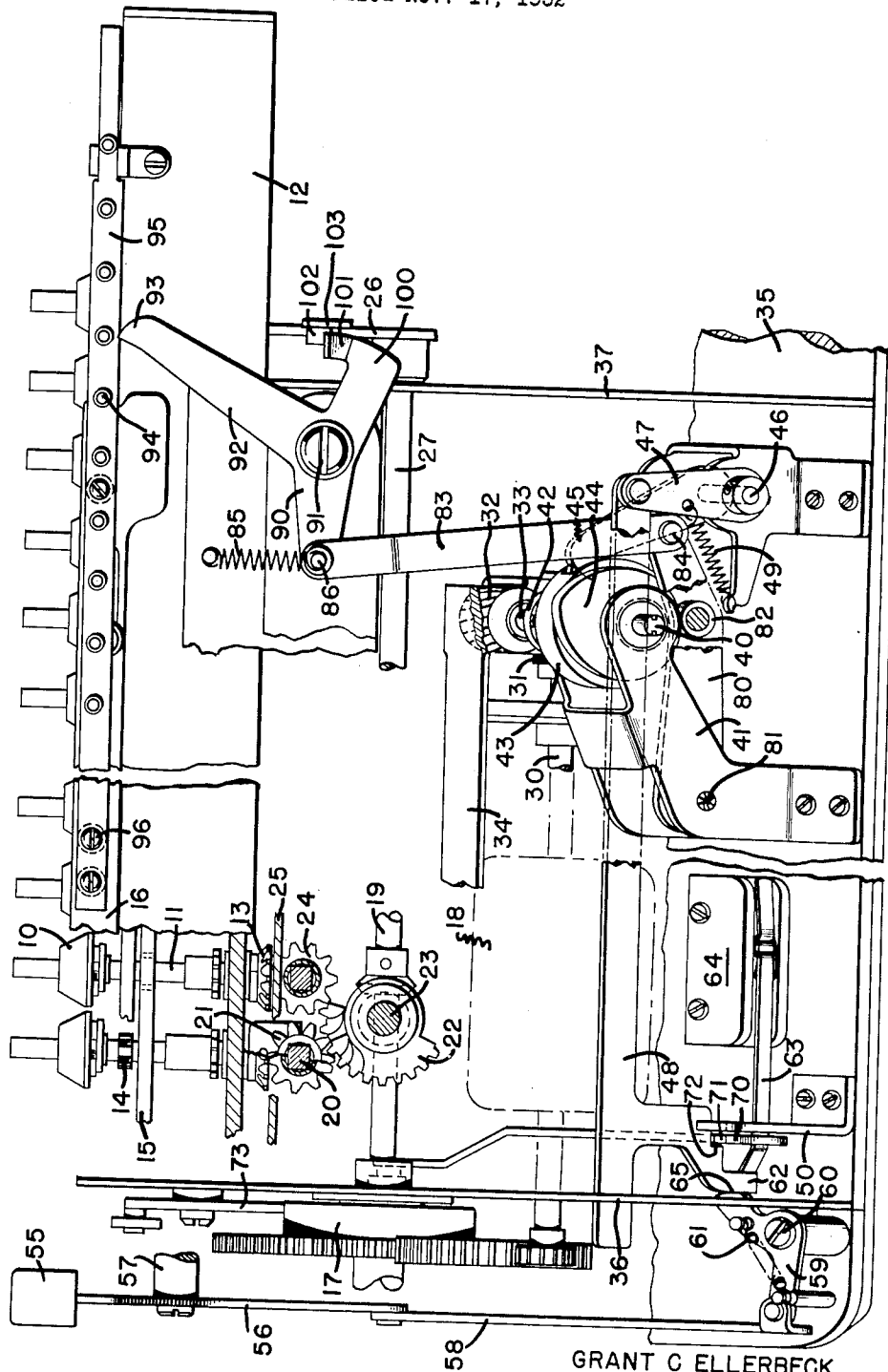
Jan. 31, 1956

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2,733,010

CLEARING MECHANISM

Filed Nov. 17, 1952



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2,733,010

CLEARING MECHANISM

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Application November 17, 1952, Serial No. 320,993

9 Claims. (Cl. 235—144)

This invention relates to calculating machines, and particularly to an accumulator clearing, or zeroizing, mechanism for a machine of the type disclosed in the patent to Carl M. F. Friden, No. 2,229,889, issued January 28, 1941.

One of the primary objects of the present invention is to provide an improved mechanism for clearing the accumulator, or product register, of a machine of the type mentioned, or the counter, or quotient, register thereof, or both.

A further object of the present invention is to provide an improved mechanism for clearing the accumulator register in connection with the transfer of the value standing in that register into a storage or back-transfer mechanism, such as that shown in my copending application, S. N. 225,733, filed May 11, 1951.

Another primary object of the present invention is to provide a single mechanism for controlling the transfer of a value from the accumulator register into a back-transfer, or factor storage, mechanism such as that disclosed in my copending application above-mentioned, and simultaneously operating the clearing mechanism in any tabulated position of the machine carriage.

A still further object of the present invention is to provide an improved clearing mechanism, particularly designed for operation with a back-transfer mechanism such as that shown in my copending application, and one which will avoid clearing by the conventional means in which the actuators of the calculating machine are operated at the same time that a clearing operation takes place.

These and further objects of my present invention will be understood from a review of the specification and claims which follow. It is believed that the specification will be more readily understood by a consideration of the drawing, which is a rear view of the machine of the patent above-mentioned showing the mechanism of my invention inserted therein, the view being taken on a plane perpendicular to the axis of the actuator shafts and at an angle to the base of the machine.

In the machine of the patent above-mentioned, values set in a keyboard, not shown, are entered into register dials 10. The register dials 10 are mounted on a plurality of substantially vertical shafts 11 which are rotatably mounted in the frame of carriage 12. The digitation, or the entering of values into the register from the keyboard, not shown, is fully described in said patent but briefly includes the differential positioning of a selection gear 21 slidably but nonrotatably mounted on a square shaft 20. The selection gear is translated along the shaft, by operation of the keys of the keyboard, not shown, to lie in a selection position with respect to the teeth of a mutilated actuator drum 22. The drum 22 is mounted on actuator shafts 23, the actuator shafts being geared to a main drive shaft 19. The drive shaft 19 is given a complete revolution in each cycle of machine operation, being driven by motor 18, through the medium of clutch 17 and conventional gearing, as shown. Thus, the selection gear 21 is given an increment of motion corresponding to the

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number of teeth of the stepped drum actuator lying in its plane, thereby rotating the shaft 20 a similar amount. This rotation of the shaft 20 is utilized to drive the accumulator dials 10 a corresponding amount, by means of the digitation spool 24 mounted on the square shaft. Associated with the digitation spool 24 is an accumulator gear 13 mounted on the lower end of the dial shafts 11. The value can be entered into the dials 10 either additively or subtractively, depending upon which gear of the digitation spool 24 is enmeshed with the accumulator gear 13, the position of the spool being dependent upon a gate 25. The gate 25 is mounted upon arms 26 which are rigidly secured to a transverse shaft 27 journaled in side frames 36 and 37 of the machine.

A value standing in the accumulator dials 10 can be cleared therefrom, or the register zeroized, by means of mutilated clearing gears 14 mounted on the dial shafts, which are actuated by the translation of a clearing rack 15. The clearing rack 15 can be moved by hand, by suitable knobs not shown herein, or can be operated through the medium of a clearing bar 16 such as shown in Friden Patent No. 2,310,281. The operation of the clearing bar 16 can be utilized to selectively clear either the accumulator dials 10 or the counter or quotient dials, not shown, by means of the mechanism shown and described in the patent to Friden, No. 2,294,083. It is assumed that my present invention will be associated with the clearing mechanisms of these last two mentioned patents, the clearing mechanism of my invention being supplemental to, rather than a substitution for, the mechanisms so shown. However, it will be understood by those skilled in the art that this present invention could be in substitution for those mechanisms if desired.

Calculating machines of the kind referred to are conventionally driven by the electric motor 18 which operates through the main clutch 17 to drive the various mechanisms of the machine, including the actuator drive shafts 23 in each and every cycle of machine operation. However, it is sometimes desirable (as in back transfer operations) to clear the register without operating the actuator mechanisms, which means clearing the accumulator by an independent means rather than through the main clutch 17 and the drive mechanism of said patents. I propose to include an auxiliary clearing mechanism which can be driven directly from the motor 18 by means of an auxiliary, or clearing, clutch. Preferably the armature shaft 30 of the motor will be lengthened to carry a worm 31. A worm gear 32 is associated with the worm 31, being driven constantly thereby. The worm gear 32 is mounted on a stub shaft 33 journaled in a suitable bracket 34 suitably supported in the machine.

Preferably the mechanism of the present invention will be mounted upon or actuated by, a shaft 40 aligned with the stub shaft 33, and connected to the latter by a suitable coupling 42. The second shaft 40 can be journaled in any suitable means, such as double armed bracket 41. This shaft carries a clutch 43, to the driven side of which is rigidly secured an operating cam 44. Clutch operation is controlled by a clutch dog 45 which is rigidly secured to a stub shaft 46 journaled in the bracket 41. An operating arm 47 is also rigidly secured to the shaft 46, the arm 47 being urged by a suitable spring 49 in a direction (counter-clockwise in the figure) to cause engagement of the clutch dog 45 with the clutch, to hold the clutch inoperative. It will be understood that the clutch 43 is of any conventional design, preferably one which is held disengaged, or inoperative, when the clutch dog 45 is in engagement therewith and which is operative when the clutch dog 45 is rocked to disengagement (clockwise in this figure). It is also preferred that the clutch be of the full-cycle type in which it is positively held engaged for a full revolution.

The clutch control arm 47 pivotally supports a link 48 which is utilized to operate the clutch as desired. The left end of the slide 48 is slidably supported by any suitable means, such as bracket 50.

Operation of the auxiliary clutch 43 can be controlled by any suitable means such as key 55 which, in its preferred form, is mounted upon a bellcrank 56 pivoted to the right frame plate 36 by a stud 57. The lower end of the bellcrank 56 is connected to a link 58, the rear end of which is pivotally connected to a horizontal bellcrank 59. The bellcrank is mounted on any suitable means, such as stud 60 secured to the base plate 35. The bellcrank is normally urged to its inoperative position by a suitable spring 61, which also holds the key 55 elevated in its inoperative position.

A nose 65 on the bellcrank 59 engages a projection 62 on the link 48—the rocking of the bellcrank 59 from depression of the key 55 (clockwise in the figure) being operative to translate the link 48 to the right to cause rocking of the clutch dog 45, thereby causing the clutch 43 to become engaged to drive cam 44. The projection 62, in turn, engages the cam, or bent over end, of the switch control lever 63 of suitable switch 64. Thus, the translation of the link 48 is not only operative to cause clutch operation, but is also operative to close the motor switch and thereby drive the mechanism of the present invention.

Conventionally in machines of the kind mentioned, operation of the switch is controlled by a link 70, which is linked to a main clutch dog 73, so that in conventional operation the dog 73 and link 70 operate in unison to give simultaneous operation of motor 18 and main clutch 17. Preferably the link 70, when related to my invention, is provided with a blocking shoulder 71, and the projection 62 of link 48 is provided with a corresponding shoulder 72 whereby the operation of link 70 prevents operation of link 48 or the operation of link 48 prevents the simultaneous operation of the link 70.

A follower arm 80 is associated with the cam 44, being pivotally mounted, as by stud 81, on bracket 41. The follower arm 80 is provided with a roller 82 which engages the periphery of the cam 44. A link 83 is pivotally secured to the free end of the follower arm by any suitable means, such as stud 84. A suitable spring 85 biases the link 83 upwardly, thereby holding the roller 82 in engagement with the periphery of the cam 44.

A bellcrank member 90 is pivotally connected to the link 83 by any suitable means such as stud 86, the bellcrank being mounted on the frame of the machine by screw 91. The upper arm 92 of the bellcrank 90 is provided with an operating nose 93 adapted, when the bellcrank is rocked (counter-clockwise in the figure), to engage one of a plurality of ordinally spaced rollers 94 which are mounted on an operating bar 95. The operating bar is affixed to the clearing bar 16 by any suitable means such as screws 96. Thus, whenever the key 55 is depressed to operate the clutch dog 45 to cause operation of the cam 44, the bellcrank 90 will be rocked, whereby its nose 93 will engage a roller 94, pushing the bars 95 and 16 (to the left in the figure) to operate the conventional clearing mechanism of the machine mentioned. Such an operation clears the accumulator register without operating the actuators 22 as is conventional in machines of this kind.

It was intimated above, that one of the preferred uses of the present invention is in connection with a back-transfer mechanism in which the digitation control gate 25 is rocked to cause engagement of the accumulator gear 13 with the minus gear of the digitation spool 24, thereby rotating the square shaft 20 a number of increments corresponding to the value standing in the ordinally related accumulator dials 10. Therefore, a preferred form of my invention comprises a third arm 100 integral with the bellcrank 90. This arm 100 is provided with a cam nose 101 which is adapted to engage

a roller 102 mounted on a bracket 103 extending from the arm 26 which supports the digitation gate 25. Therefore, the rocking of the bellcrank 90 is also operative, through engagement of cam 101 with roller 102, to rock the gate 25 to cause engagement of the accumulator gear 13 with the minus gear of the digitation spool 24. Thus, the consequent clearing of the accumulator register will transfer the value standing in the various dials 10 into the corresponding orders of the square shafts 20 to place it into the back-transfer or factor storage mechanism of my copending application above-mentioned.

I claim:

1. In a calculating machine having an accumulator register containing a plurality of ordinally arranged dials, 15 actuating means, digitation control means for connecting said actuating means to said accumulator additively or subtractively, a reciprocatory clearing mechanism for said accumulator, a motor, and a main clutch for driving said actuating means, the improvement which comprises an auxiliary clutch driven by said motor, means 20 for causing engagement of said auxiliary clutch, means operated by said clutch for reciprocating said clearing mechanism, and means operated by said clutch for operating said digitation control means to connect said accumulator register to said actuating means.

2. In a calculating machine having a frame, a carriage mounted for transverse shifting on said frame, an ordinally arranged accumulator register mounted in said carriage, an actuating mechanism, a drive means including a motor and a main clutch for controlling operation 30 of said operating mechanism, and a reciprocatory clearing member for said accumulator register, the combination which comprises an auxiliary clutch driven by said motor, drive means including a cam operated rocking member driven by said clutch, and a plurality of ordinally spaced projections mounted on said reciprocatory member and engageable by said rocking member.

3. In a calculating machine having a frame, a carriage mounted for transverse shifting on said frame, an ordinally arranged accumulator register mounted in said carriage, an actuating mechanism, a motor, a main clutch controlling operation of said operating mechanism, and a reciprocatory clearing member for said accumulator register, the combination which comprises an auxiliary 45 clutch driven by said motor, cam means driven by said clutch, a linkage operated by said cam means, a rocker operated by said linkage, and a plurality of ordinally spaced projections mounted on said reciprocatory member and engageable by said rocker.

4. In a calculating machine having an accumulator register containing a plurality of ordinally arranged dials, actuating means for entering values into said accumulator dials additively or subtractively, an accumulator clearing device, a drive means including a motor and a main 50 clutch for driving said actuating means, the combination which comprises an auxiliary clutch driven by said motor, means for causing engagement of said auxiliary clutch, a cam affixed to the driven side of said auxiliary clutch, a linkage operated by said cam, means operated by said linkage for operating said clearing device, and means operated by said linkage for operatively connecting said accumulator dials to said actuating means.

5. The apparatus of claim 4 comprising also means operated by said linkage for operating said plus or minus control mechanism to cause engagement of said actuating mechanism with said accumulator mechanism for subtractive operation.

6. In a calculating machine having a frame, a carriage mounted for transverse shifting on said frame, an ordinally arranged accumulator register mounted in said carriage, an actuating mechanism, a drive means including a motor and a main clutch for controlling operation of said operating mechanism, and a reciprocatory clearing member operative to clear said accumulator register, the improvement which comprises an auxiliary clutch mounted 75

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on said frame, means for controlling operation of said auxiliary clutch, a rocking member mounted on said frame and operated by said auxiliary clutch, a plurality of ordinally spaced projections mounted on said reciprocatory member and engageable by said rocking member.

7. In a calculating machine having a shiftable accumulator register containing a plurality of ordinally arranged dials, actuating means for entering values into said accumulator dials additively or subtractively, a reciprocatory clearing mechanism, a motor, and a main clutch for driving said actuating means, the improvement which comprises an auxiliary clutch driven by said motor, means for causing engagement of said auxiliary clutch, means operated by said auxiliary clutch for operating said clearing mechanism, and means operated by said auxiliary clutch for operating said plus or minus control mechanism to cause engagement of said actuating mechanism with said accumulator mechanism for subtractive operation simultaneously with operation of said clearing mechanism.

8. In a calculating machine having a frame, a carriage mounted for transverse shifting on said frame, an accumulator containing a plurality of ordinally arranged dials mounted in said carriage, an actuating mechanism, a motor, a main clutch between said motor and said actuating mechanism for controlling operation of said actuating mechanism, a digitation control means for controlling the entry of values from said actuating mechanism into said accumulator dials additively or subtractively, and a reciprocatory clearing means for said accumulator dials mounted in said carriage, the combination which comprises an auxiliary clutch mounted in said frame and driv-

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able by said motor, means for operating said auxiliary clutch, a linkage including a rocking member mounted on said frame and operated by said clutch, a plurality of ordinally spaced projections mounted on said reciprocatory clearing means and engageable by said rocking member, and means operated by said rocking member for positioning said digitation control means in subtractive position.

9. In a calculating machine having a frame, an accumulator containing a plurality of ordinally arranged dials mounted for transverse shifting on said frame, an actuating mechanism, drive means including a motor and a main clutch for controlling operation of said actuating mechanism, a digitation control means for controlling the entry of values from said actuating mechanism into said accumulator dials additively or subtractively, and a clearing means for said accumulator dials including a clearing rack and a reciprocatory operating member for operating said rack, the improvement which comprises an auxiliary clutch mounted in said frame and driven by said motor, means for operating said auxiliary clutch, cam means driven by said clutch, a linkage mounted on said frame and operated by said cam means, a bellcrank operated by said linkage, a plurality of ordinally spaced projections mounted on said operating member and engageable by said bellcrank, and means operated by said bellcrank for positioning said control member in subtractive position.

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