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REGISTER RESETTING MECHANISM.

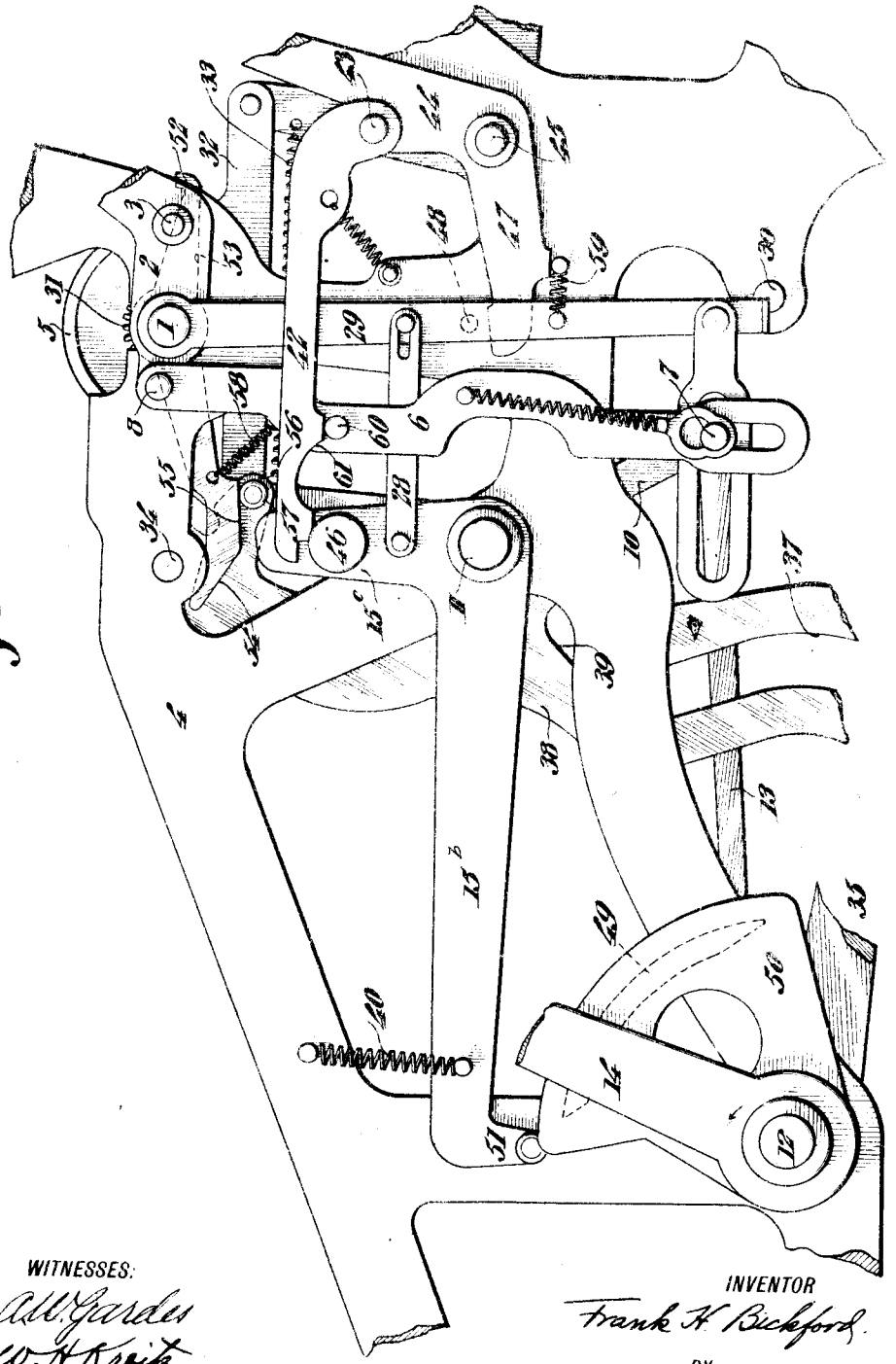
APPLICATION FILED OCT. 21, 1911.

**1,066,700.**

Patented July 8, 1913.

3 SHEETS—SHEET 1.

Fig. 1



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3 SHEETS—SHEET 2.

Fig. 2

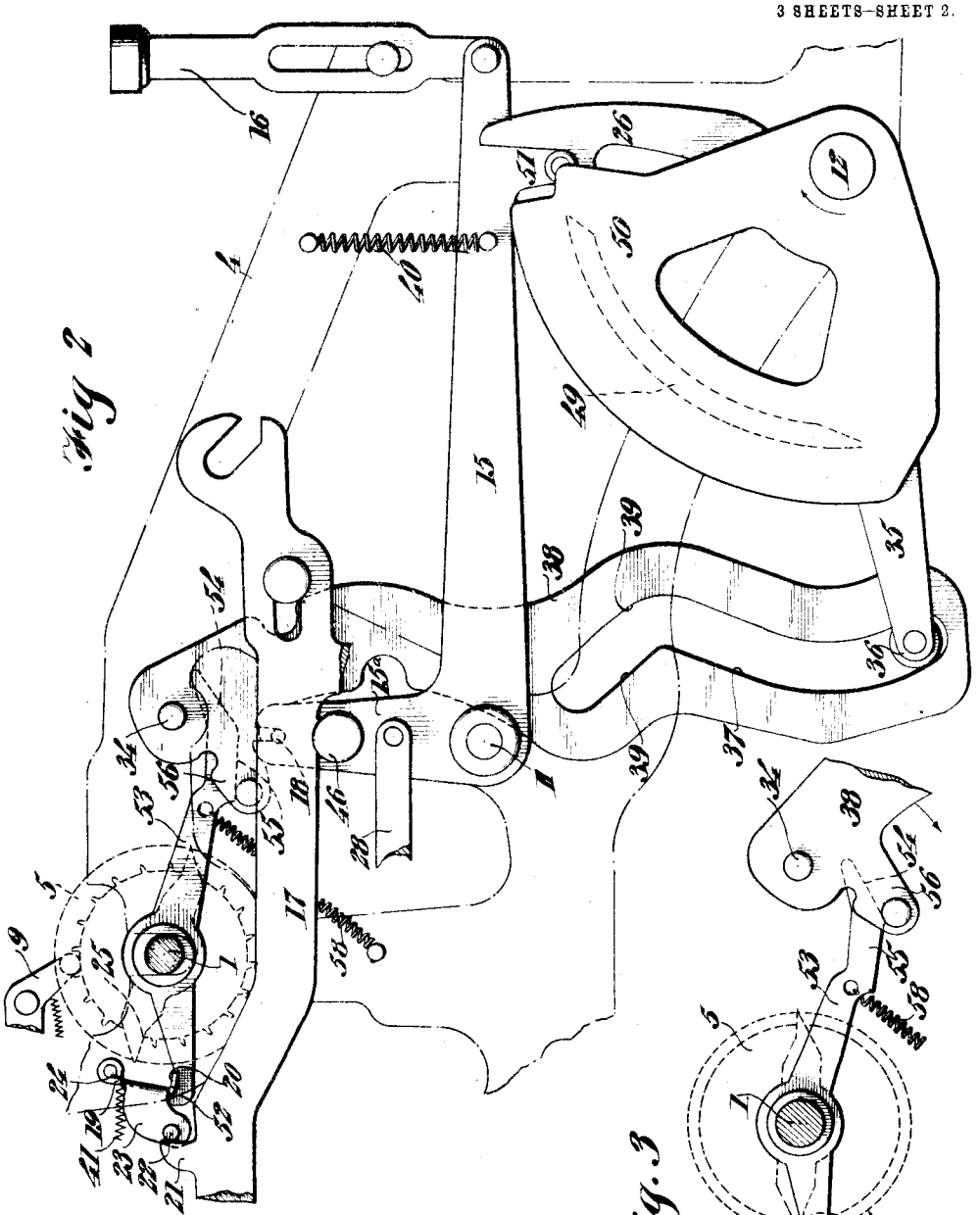


Fig. 3



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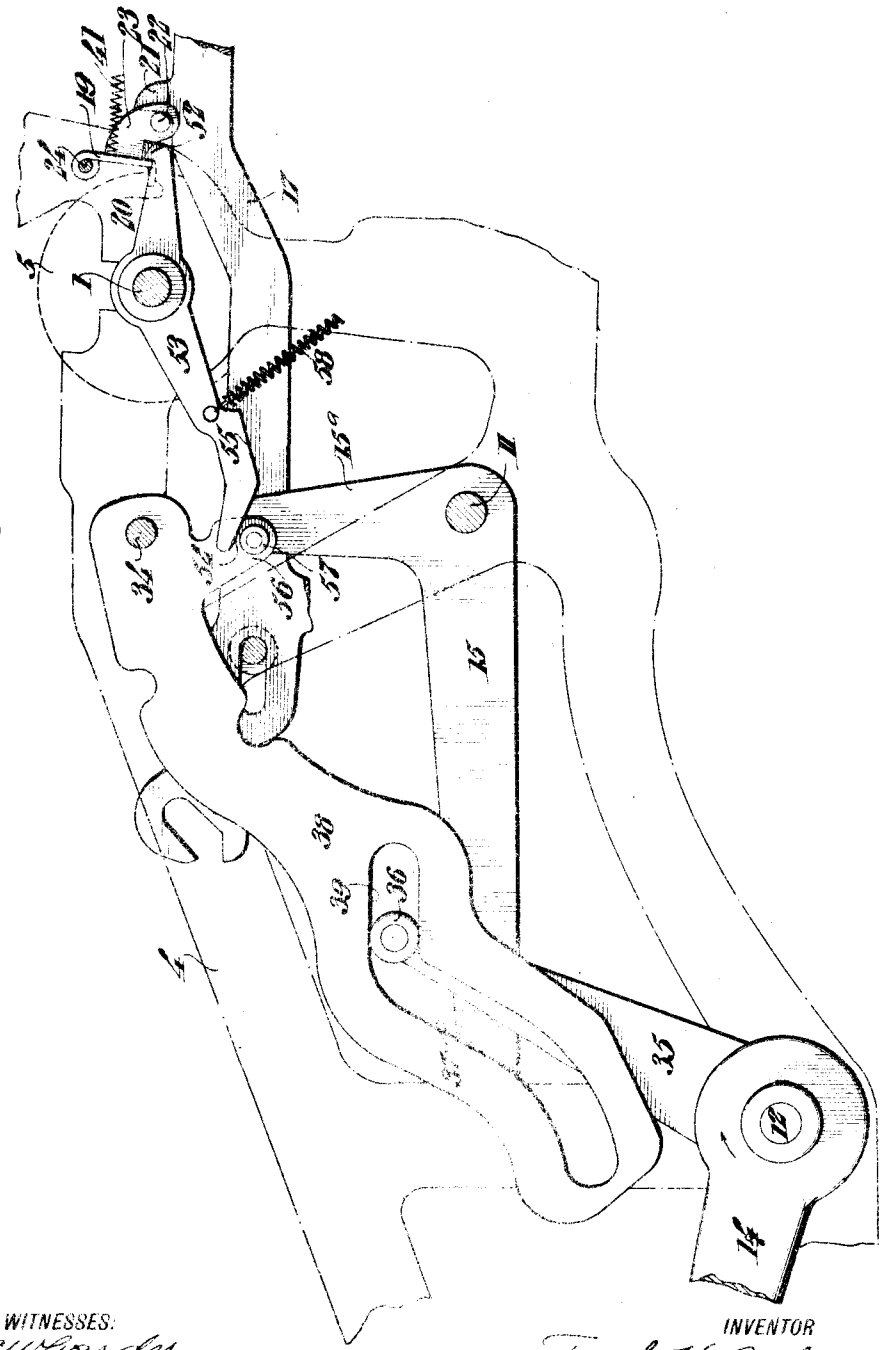
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3 SHEETS—SHEET 3.

Fig 4




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# UNITED STATES PATENT OFFICE.

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## REGISTER-RESETTING MECHANISM.

1,066,700. Specification of Letters Patent. Patented July 8, 1913.

Application filed October 21, 1911. Serial No. 656,065.

*To all whom it may concern:*

Be it known that I, FRANK H. BICKFORD, a citizen of the United States, residing at Muncie, Delaware county, Indiana, have invented new and useful Improvements in Register-Resetting Mechanisms, of which the following is a specification.

This invention relates to improvements in resetting mechanisms for registers whereby to arrest the counters in their zero positions when the machine is cleared, in readiness for the next example.

The invention is an improvement on the well-known Wales resetting mechanism illustrated, for instance, in United States Letters Patent #842,232 granted to C. N. McFarland, January 29, 1907. In said patent, the depression of a total key rocks a setting lever to operate a link which swings a series of projections on a carrier into the paths of stops secured to turn with the individually rotatable numeral wheels or counters of a register. The main drive shaft is then turned in one direction to first lock the setting lever in position so that the projections or abutments are held in place, after which it effects the engagement of the counters and their driving mechanism, whereby the counters are turned until the stops thereon strike the interposed projections or abutments, at which time the counters display zeros at the sight or reading line. After the main drive shaft completes its initial stroke, it is returned to its position of rest to disengage the counters and driving means and restore the latter to normal position. At the beginning of its return stroke, the shaft releases the setting lever which is restored to normal position, thereby permitting or effecting the return of the abutments to idle position.

One object of the present invention is to maintain the abutments in effective position until the counters have been restored to initial position to prevent accidental turning of said counters in one direction, from the time when they have been reset to zero, until they are disengaged from their driving means and locked by the detents, which normally hold them against accidental rotation when at rest.

In the accompanying drawings, Figure 1 is a side view of one embodiment of the invention applied to the well-known Wales calculating machine, the parts being at rest or in normal position. Fig. 2 is a similar view of the machine from the side opposite that shown in Fig. 1, parts being omitted. Fig. 3 is a detail, showing a counter arrested in its zero position, and its abutment about to be unlocked on the return stroke of the main drive shaft. Fig. 4 is a side view, showing the abutment in locked position at the beginning of the return stroke of the main shaft.

It will be understood that the invention is not restricted in its application to the Wales calculating machine, although for convenience, it is illustrated in connection therewith.

An axle 1 mounted in arms 2 (Fig. 1) pivoted at 3 to opposite sides of the frame 4, carries independently rotatable counters 5 thereon.

Props 6 on opposite sides of the frame, rest on a trip rod 7 and are jointed at 8 to the arms 2, to support the counters in normal idle position at which time the counters are held against accidental turning by detents 9 (Fig. 2). The trip rod is suspended by arms 10 (Fig. 1) loosely mounted on a shaft 11 journaled in the frame, and the main drive shaft 12 is connected by links 13 with said rod to rock it back and forth. A handle 14 may be used to turn the main drive shaft.

Assuming the result of one or more operations to have been registered on the counters in the well-known manner, and that it is desired to clear the machine, that is, to return the counters to zero, a set-lever 15 (Fig. 2) is rocked, by depressing a key 16, for instance. An arm $15^a$ of said lever 15 operates a link 17 with which it may be loosely connected, as at 18, to press the latter against a shiftable carrier 19 mounted in the frame 4 and having checks or abutments 20. The link 17 preferably has a shoulder 21 which impinges a stud 22 on a bracket 23, fixed on the carrier, the latter being pivoted at 24 to swing toward the counters when struck by the shoulder, to interpose the abutments in the paths of stops 25 fast with the counters (Figs. 2 and 3). A hook 26 (Fig. 2) locks the lever 15 in the position to which it has been rocked, by catching over a stud 27 on the lever.

The lever 15 is fixed to the shaft 11 extending across the frame 4, to rock the shaft 11 and with it a second lever $15^b$, (Fig. 1),

similar to lever 15, fast on the shaft 11 on that side of the machine opposite lever 15. The arms 15ª and 15ᶜ of set-levers 15, 15ᵇ have connecting bars 28 fastened thereto and to legs or supports 29 journaled preferably on the axles 1 and depending in line with seats 30 on the frame. In the adding operation of the machine, these legs or supports rest on the seats when the trip rod is initially operated to defer the engagement of pinions 31 (fast on the respective counters 5), with the driving means or racks 32, until said racks have been projected by their driving springs 33, and arrested by key-operated stops (not shown). The counters are then rotated in one direction, as the racks are returned to initial position to register the amount set up on the keyboard. This mechanism is well-known and shown in prior patents, to which reference has been made. In clearing the machine, however, it is desired to reverse the direction of rotation of the counters, to bring them back to zero position. Hence, the levers 15, 15ᵇ, when operated, draw the legs or supports 29 out of line with their seats through the connecting bars 28, to enable the counters to engage their driving means, prior to the operation of the latter. By displacing the legs 29, the counters are supported out of engagement with their racks 32 by the props 6 and rod 7.

The main shaft 12, on its initial stroke, in the direction of the arrows, (Figs. 1 and 2), pulls the links 13 forwardly to swing the trip rod 7 in a descending arc to engage the counters with their driving means, prior to the advance of the latter.

A rock shaft 34 journaled in the frame 4 carries rack-restraining and restoring devices (not shown) to normally hold the racks in their positions of rest. The main shaft 12, on its initial stroke, swings an arm 35 fast therewith, said arm having a roll 36 playing in a cam slot 37 formed in a crank 38 fixed to the rock shaft. During the first part of the initial stroke, while the counters are being engaged with their driving means when clearing the wheel, the arm rides substantially idly in the cam slot, whereby to give the counters time to engage their driving means prior to the release of the latter. When the roll 36 reaches the cam 39 of said slot, however, it quickly swings the crank 38 to rock the shaft 34 and withdraw the rack-restraining devices, whereby the racks 32 are free to be projected by their springs 33. The racks, as they are propelled, turn the counters 5 in a reverse direction to that in which the counters are turned when adding or accumulating, until the stops 25 strike the cheeks or abutments 20 to arrest the counters, at which time the latter display zeros at the reading line. By reason of the contact of the stops and abutments, the driving means are also arrested against further forward movement, rebounding of the counters being overcome by the tendency of the driving means to project itself farther in its original path.

The set-levers 15, 15ᵇ, which have been held in position during the initial stroke of the main drive shaft 12, are freed to the action of springs 40 at the completion of said initial stroke, which springs restore the levers 15, 15ᵇ to normal position, and rock the arms 15ª, 15ᶜ rearwardly. Arm 15ª returns the link 17 to initial position and thereby releases stud 22 on the carrier 19 to free the carrier to the action of a restoring spring 41, (Figs. 2 and 4), which tends to retract the abutments 20 from the paths of the stops 25.

Thrust bars 42, (Fig. 1) pivoted at 43 to resetting levers 44 fulcrumed at 45 to the opposite sides of frame 4, drop behind studs 46 on the arms 15ª, 15ᶜ of the levers 15, 15ᵇ when the arms are rocked forwardly upon the depression of key 16. The arms 15ª, 15ᶜ on their return, press the thrust bars rearwardly to rock the resetting levers 44, the arms 47 of which contact studs 48 on the respective legs or supports 29 to raise the latter and thereby disengage the counters from their driving means, at the outset of the return stroke of the main drive shaft 12 and prior to the restoration of the drive means toward initial position. Cams 49 on segments 50 turning with the main shaft 12 may assist the resetting levers to restore the counters, by pressing against fingers 51 on the set-levers 15, 15ᵇ.

As the main shaft continues on its return stroke, it operates through arm 35, the crank 38 and rock shaft 34, to restore the driving means and the trip mechanism to normal position.

The foregoing construction is old and only constitutes a part of the present invention, in so far as it is combined with new parts now to be set forth.

It will be observed that the clearing mechanism releases the carrier 19 shortly after the main drive shaft 12 starts upon its return stroke. This ordinarily, would leave the counters or wheels 5 free to turn during the interval between the disengagement of the driving racks 32 therefrom, and the engagement of the locking detents 9 therewith. Furthermore, the abutments 20 were formerly permitted to start on their return to idle position, in a downward arc at about the same time that the counters were being disengaged from their driving racks, which latter, owing to the pressure of their driving springs, caused the counters to turn very slightly on their axle and follow the abutments, until the counters were fully released from the racks, whereupon a slight rebound of the counters was liable to occur. Owing to this slight turning of the counters, it was

possible that the contact of the counters with the detents 9 would turn the counters a full space, and thereby leave an amount on the register when it should be clear. To avoid this disadvantage, I contrive to lock the abutments in effective position until the counters have been locked by the detents 9, to prevent the rotation of the counters, above mentioned. To this end I arrange to hold the abutments effective against the tendency of the restoring spring 41, by a latch 52 which catches the carrier 19 when it is in active position and retains it against the spring tension. Said latch is mounted on the rear arm of a lever 53, preferably journaled intermediate its ends on the axle 1. Said latch is controlled by means, as a shifting part of the machine, and preferably a finger or tappet 56 which coöperates with a cam 54 on the forward arm of said lever, said cam merging into a dwell portion 55, normally contacted by said shiftable finger or tappet 56, to hold the latch idle. Said finger is preferably operated through the driven crank 38. In the present instance, said finger or tappet comprises a prong on the crank, having a roll 57 to contact the cam edge of the lever 53.

In the operation of clearing the machine, the lever 15 having been rocked to shift the abutments 20 into the paths of the stops 25, the crank 38 when swung forwardly during the initial stroke of the main drive shaft 12, withdraws the roll 57 from the cam 54, 55 to free the lever to the action of a spring 58 which thereupon rocks the lever 53 to cause the latch 52 to catch or take behind the carrier 19 and lock it in effective position (Fig. 4). The lever 15, it will be remembered, releases its control of the carrier at the outset of the return stroke of the main drive shaft, but the latch 52 remains effective to prevent the return of the carrier 19 and its abutments 20 to idle position, until the counters have been disengaged from their driving means and restored to normal position, where they are held against accidental turning by the detents 9. The drive shaft 12 on its return, rocks the arm 35 to swing the crank 38 (Figs. 4 and 3) and cause the tappet or finger 56 to contact the lever 53 and release the latch 52 from the carrier 19, whereupon the spring 41 withdraws the abutments 20 from the paths of stops 25. The restoration of the counters by the thrust bars 42 and resetting levers 47 at the outset of said return stroke, however, has shifted the latch lever 53 away from the tappet 56, so that the latter does not strike the cam 54 on lever 53 until the main drive shaft has completed a considerable part of its return stroke. When the tappet strikes the cam, it rides therealong and swings the latch lever on the axle 1 to disengage the latch 52 from the carrier, whereupon the spring 41 restores the carrier and its abutments to idle position. The finger normally remains in contact with the dwell portion 55 of said cam to hold the latch idle against the tension of the spring 58. The disengagement of the counters from their drive means raises the free ends of the legs or supports 29 to clear the seat 30, whereupon springs 59 (Fig. 1) may draw the legs over said seats. The trip rod 7 swings in an ascending arc during the return stroke of the main shaft, and rocks the props 6 to return the latter to normal position. The props, on their return, press tappets 60 against cams 61 on the thrust bars 42 to release the bars from the studs 46 of levers 15, $15^b$, whereupon the legs or supports 29 drop on to their seats 30 to sustain the counters until the rod 7 is completely returned, at which time, it raises the props slightly and relieves the legs of the weight of the counters. This operates to slightly elevate the legs or supports from their seats 30 so that the latter oppose no obstruction to the displacement of the legs when the key 16 is depressed.

It is evident that changes might be made in the form, arrangement and operation of the several parts set forth without departing from the spirit and scope of this invention.

What I claim as new is—

1. In a register, the combination with a counter, drive means for the counter, normally disconnected therefrom; and means to effect the connection and disconnection of the counter and its drive means; of a zero-resetting mechanism, comprising a stop on the counter; an abutment shiftable into the path of the stop, to arrest the latter when it is returned to zero position; and means to permit the restoration of the abutment to idle position only after the disconnection of the counter and its driving means.

2. In a register, the combination with a driving rack; a rotatable counter normally raised out of engagement therewith; and means to drop the counter into mesh and raise it out of mesh with the rack; of a zero-resetting mechanism, comprising a stop on the counter; and an abutment shiftable into the path of the stop prior to the rotation of the counter, and restored to idle position subsequently to the return of the counter to raised position.

3. In a register, the combination with a counter; drive means for the counter, normally disconnected therefrom; and means to effect the connection and disconnection of the counter and its drive means; of a zero-resetting mechanism, comprising a stop on the counter; a shiftable abutment interposed in the path of the stop; and a catch to hold the abutment in effective position until after the disconnection of the counter and its driving means.

4. In a calculator, the combination with

registering mechanism, including counters, and means to effect the operation thereof; of a zero-resetting mechanism comprising stops on the counters; shiftable abutments interposable in the paths of the stops; and means controlled by the counter-operating mechanism to lock the abutments in effective position.

5. In a calculating machine, the combination with a registering mechanism, including a counter, and drive means therefor; of zero-resetting mechanism, including a normally idle abutment; a stop on the counter, means to shift the abutment into the path of the stop; and other means to maintain the abutment in active position after the shifting means has returned to normal position.

6. In a calculating machine, the combination with a registering mechanism, including a counter, and drive means therefor; of zero-resetting mechanism, including a normally idle abutment; a stop on the counter, means to shift the abutment into the path of the stop; a latch independent of the shifting means; and a rocking member controlling the latch, to permit it to lock the abutment in effective position.

7. In a calculating machine, the combination with a registering mechanism, including counters, and drive means therefor; of a zero-resetting mechanism comprising stops on the counters, abutments shiftable into the paths of the stops; a spring-pressed latch normally tending to lock the abutments in effective position, and having a cam; and a rocking member normally contacting the cam to hold the latch inoperative.

8. In a calculating machine, the combination with a registering mechanism, including counters, and drive means therefor; of a zero-resetting mechanism comprising stops on the counters, abutments shiftable into the paths of the stops; a lever having a latch formed thereon to lock the abutments in effective position and a rocking member normally contacting a cam on said lever to hold the latch out of operation.

9. In a calculating machine, the combination with counters, drive means therefor, and mechanism to effect the connection and disconnection of said counters and their drive means; of a setting mechanism, to control the time of engagement and disengagement of the counters and their drive means; stops turning with the counters; abutments shiftable by said setti g mechanism into the paths of the stops; and a releasable lock to maintain the abutments in effective position subsequently to their release by said setting mechanism.

10. In a calculating machine, the combination with counters, drive means therefor, and mechanism to effect the connection and disconnection of said counters and their drive means; of a setting mechanism, to control the time of engagement and disengagement of the counters and their drive means; means to restore the setting mechanism to normal position; stops turning with the counters; abutments shiftable by said setting mechanism into the paths of the stops; a releasable lock to maintain the abutments in effective position subsequently to their release by said setting mechanism; and means other than the setting mechanism and operable after said setting mechanism is restored to normal position, to release the lock to enable the abutments to be shifted to idle position.

11. In a calculating machine, the combination with counters, driving means therefor, and mechanism to shift the counters to connect them with and disconnect them from their driving mechanism; of zero-resetting mechanism, including stops turning with the counters; abutments shiftable into and out of the paths of the stops to arrest the wheels in zero position; a latch to lock the abutments in effective position, and shiftable with the counters when the latter are connected to and disconnected from their driving means; and means to release the latch, and relatively to which the latch is shifted by the counter-shifting mechanism.

12. In a calculating machine, the combination with counters, and drive mechanism therefor; of a zero-resetting mechanism comprising stops on the counters; abutments shiftable into the paths of the stops; means to shift the abutments to effective position; a latch independent of said means to lock the abutments in effective position and hold them after the return of said means to normal position; and means to release the latch.

13. In a calculating machine, the combination with a drive shaft, individually rotatable counters, and drive means therefor; of a resetting mechanism for the counters, including stops on the counters; and abutments interposed in the paths of said stops; and a latch controlled by the drive shaft to hold the abutments effective until the said shaft has nearly completed its return stroke.

14. In a calculating machine, the combination with driving means, and counters adapted for engagement and disengagement relatively to each other; and detents to hold the counters against rotation, when disengaged from the driving means; of clearing mechanism, including a manually-operable member; stops on the counters; abutments shifted by the manually-operable member into the paths of the stops, to arrest the counters in zero position; said manually-operable member adapted for restoration prior to the effective coöperation of the locking detents and counters, thereby releasing the abutments; and means to lock the abutments in effective position until the coun-

ters are locked by their detents, notwithstanding their release by said manually-operable member.

15. In a calculating machine, the combination with counters and drive mechanism therefor; of a resetting mechanism for said counters, including stops on the counters, abutments shiftable into the paths of the stops, and means to hold said abutments in effective position.

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In the presence of—
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