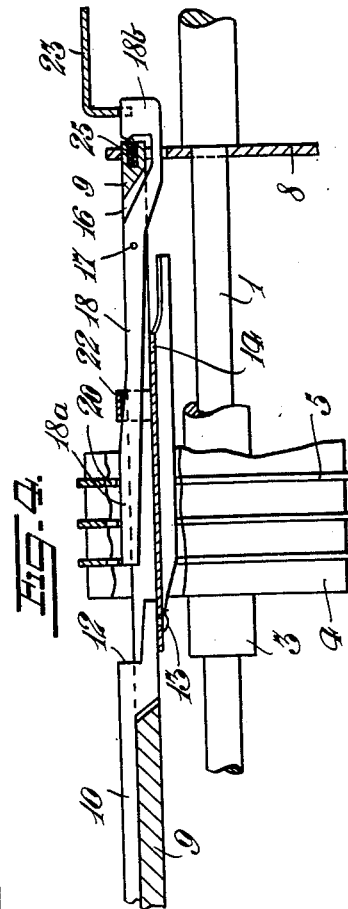
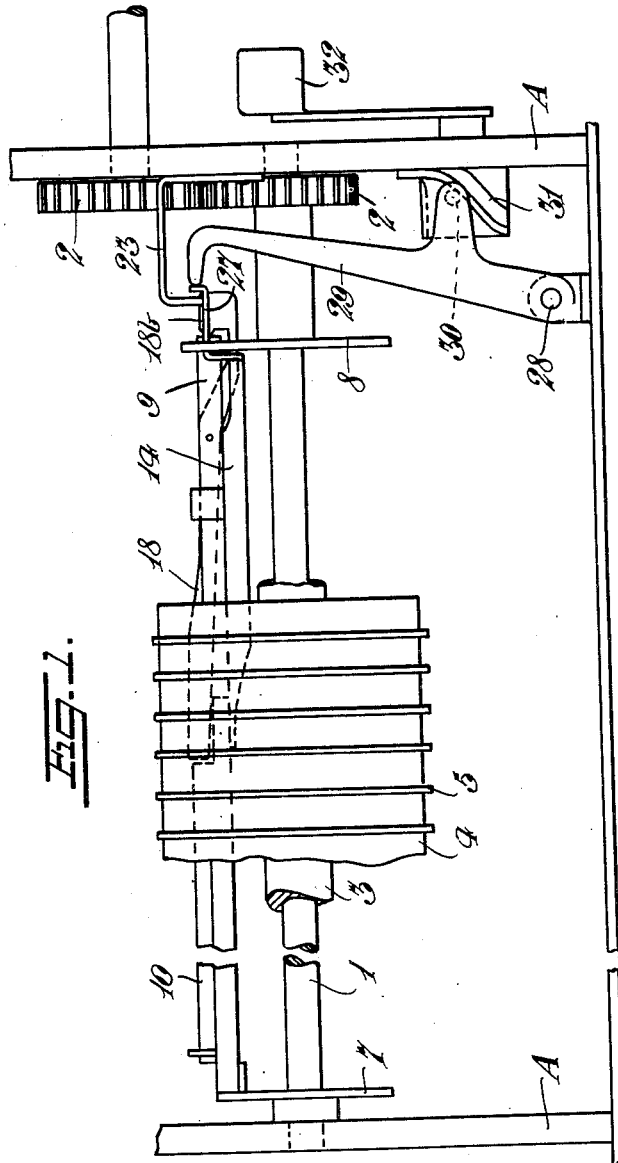


Sept. 19, 1933.

B. CARLSTRÖM
CALCULATING MACHINE
Filed Nov. 16, 1931

1,927,771

3 Sheets-Sheet 1



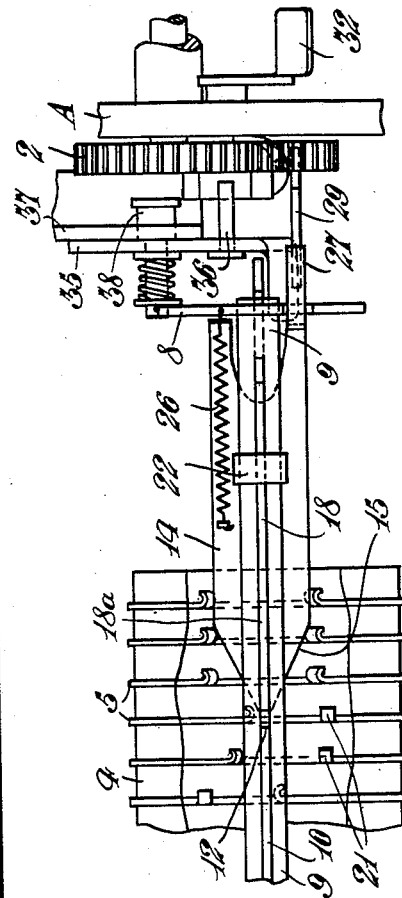
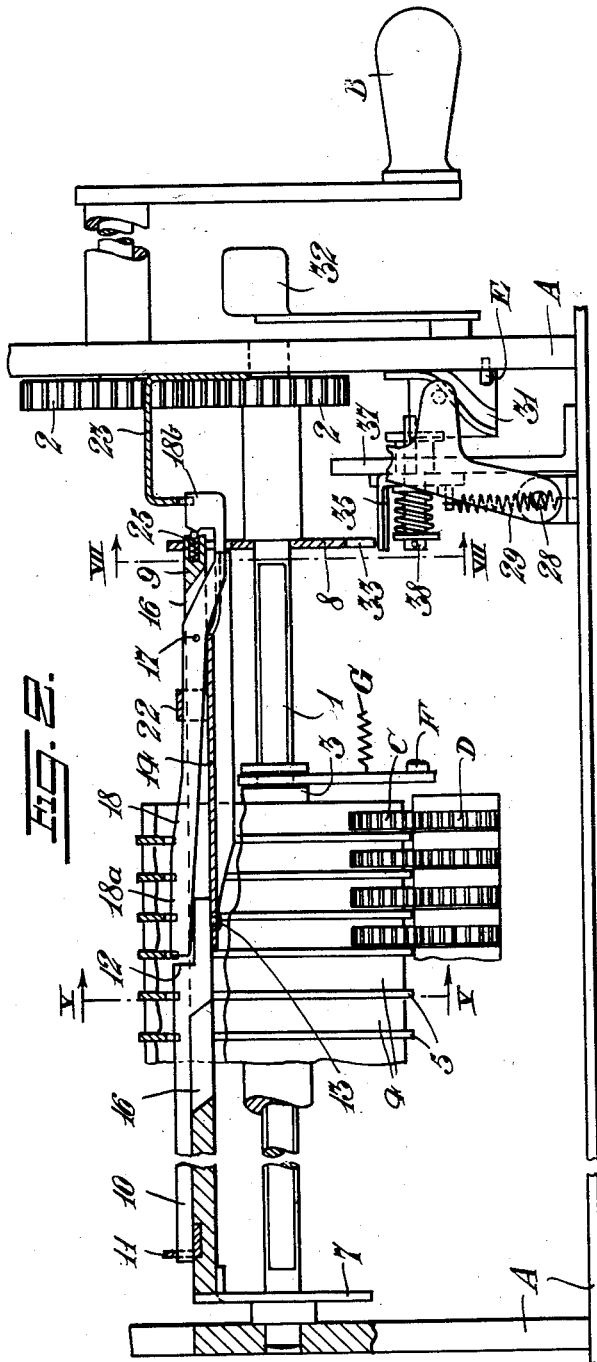
Inventor:
Bengt Carlström
By Summers & Young
attys.

Sept. 19. 1933.

B. CARLSTRÖM
CALCULATING MACHINE
Filed Nov. 16, 1931

1,927,771

3 Sheets-Sheet 2



Inventor.
Bengt Carlström.
By Sommer & Spang
Attorneys.

Sept. 19, 1933.

B. CARLSTRÖM
CALCULATING MACHINE
Filed Nov. 16, 1931

1,927,771

3 Sheets-Sheet 3

Fig. 5.

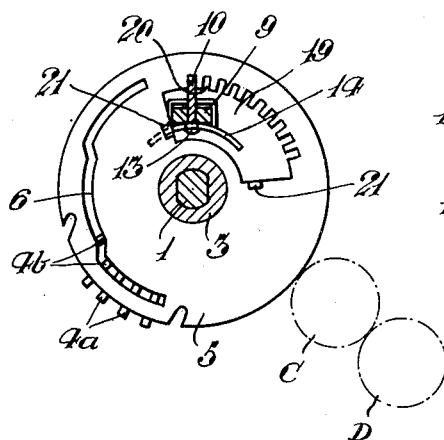


Fig. 6.

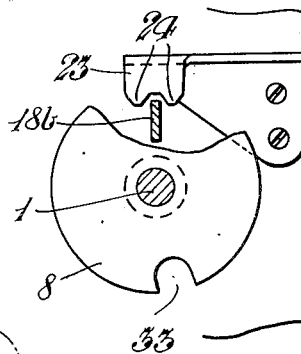


Fig. 7.

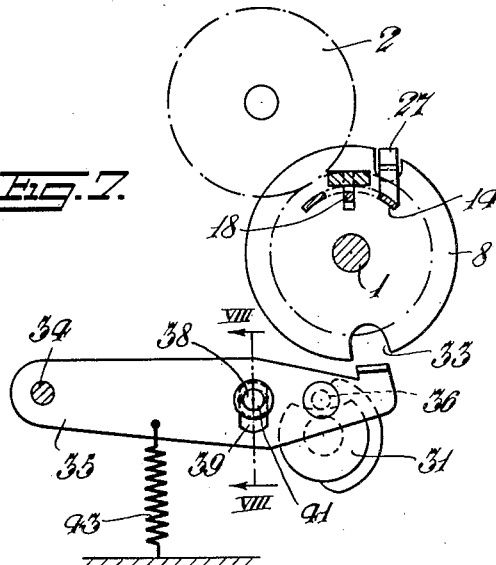
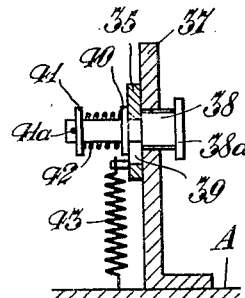


Fig. 8.



Inventor,
Bengt Carlström
By *Sommers & Young*
attys.

UNITED STATES PATENT OFFICE

1,927,771

CALCULATING MACHINE

Bengt Carlström, Atvidaberg, Sweden, assignor
to Aktiebolaget Facit, Atvidaberg, Sweden

Application November 16, 1931, Serial No.
575,348, and in Germany June 9, 1931

19 Claims. (Cl. 235—81)

This invention relates to calculating machines having rotary means which may be set for actuating the numeral wheels of the various registers or counters. Well-known calculating machines of this type are the so-called Odhner-machines, having teeth slidable in the radial or axial direction in the rotor disks and adapted to be set by means of a curve slot disk or a setting ring. When the rotor disks are rotated by means of a handle or crank in either direction said teeth will actuate the numeral wheels of a counter in accordance with the number set. It was, however, also proposed to make the teeth slidable in the axial direction and there are also other types of calculating machines, to which this invention is applicable.

In such machines the members actuating the numeral wheels were generally zeroized or cleared positively by use of mechanical means, rotated by hand by means of a wing nut, a lever, or the like to restore said members to their initial position to be ready for the next setting. Said actuating members are generally identical with the setting members or secured to them, but separate setting members are sometimes used. At this clearing operation all members set were simultaneously returned to their original position, and consequently, a rather great force was necessary for this work. Said known clearing devices also suffer from the drawback that they are rather heavy and bulky, thus rendering the construction of small, portable machines difficult or even impossible. By use of such clearing members the clearing operation is accompanied by a rather strong and disagreeable noise, because the metallic zeroizing or clearing means simultaneously strike upon the metal parts of several members to be cleared.

The chief object of this invention is to overcome said inconveniences and to effect a safe, easy and rather noiseless clearing of said rotary members by use of a clearing device having a very compact construction.

A further object of the invention is to create a zeroizing device applicable to machines in which the means for actuating the numeral wheels are to be set in two opposite directions as well as to machines, in which said means are to be set in one direction only.

A further object of the invention is to provide for a zeroizing or clearing device effecting the clearing of the different members successively, so that only some two or three members are cleared simultaneously.

A further object of the invention is to effect the

clearing by use of a device striking the different members obliquely so as to cause the least noise possible and to operate very softly.

Other objects will be evident from the following specification.

One embodiment of the invention is illustrated in the annexed drawings.

Fig. 1 is a front elevation of a calculating machine of the cam-disk and pin-wheel type having a clearing device in accordance with this invention, some parts being broken away.

Fig. 2 shows the same elevation, partially in longitudinal section, during the course of the setting operation.

Fig. 3 shows a plan view of the essential part of Fig. 2, seen from above, some parts of the pin-wheels being broken away.

Fig. 4 shows a part of Fig. 2, the different parts being shown in the course of the clearing operation.

Fig. 5 shows a section on the line V—V in Fig. 2 through the pin-wheel rotor seen in the direction of the arrows to illustrate a side-view of a pin-wheel.

Fig. 6 is a side-view of a detail of the calculating machine, viz the cam guide for reversing the ball mechanism which serves to lock the pin-wheels during the calculating operations.

Fig. 7 is a cross-section on the line VII—VII in Fig. 2, seen in the direction of the arrows, and illustrates particularly the device for locking the pin-wheel rotor against rotation during the zeroizing operation.

Fig. 8 is a vertical section on the line VIII—VIII in Fig. 7, seen in the direction of the arrows.

Referring now to the drawings 1 indicates a main operating shaft rotatably journaled in the machine frame A. The shaft 1 may be rotated by hand by means of an operating handle or crank B via a toothed gearing 2. On said shaft 1 a carriage 3 is slidably journaled but prevented from rotating in relation to the shaft 1 by plane surfaces formed on said shaft, as best seen from Fig. 5. The carriage 3 carries and forms a hub for the pin-wheel rotor, which in well-known manner consists of a number of wheels 4 and an equal number of curve slots or cam disks 5. The wheels 4 are rigidly secured to the carriage 3 and provided with nine slidable pins or teeth 4a each, while the disks 5 are rotatably journaled on the carriage 3 and provided with a curve slot 6 each (Fig. 5) engaging projections 4b on said teeth to set the latter.

In the embodiment shown the disks 5 may have an angular rotation in two opposite directions to

set the teeth 4a. The disks 5 are set separately by means of a key mechanism and after one wheel has been set, the whole pin-wheel rotor is moved one step to the left (in Figs. 1-4) to bring the

5 next wheel in position to be set by said key mechanism. A setting mechanism of this type is shown in the U. S. patent application No. 431,872 for "Improvements in calculating machines" filed by Karl Viktor Rudin on the 27th, February, 1930, and shown and described in German Patent #535,576, and it is, therefore, not necessary to describe the same here in detail.

It is, however, evident that the pin-wheels may be set in any other well-known manner, for instance, directly by hand, as is usual in the calculating machines of the so-called Odhner type.

On the shaft 1 two disks or arms 7 and 8 are secured and between them a rail or bar 9 parallel to the shaft 1 is fixed. The three members 7, 8 and 9 form a rigid unit together with the shaft 1. A locking rod or rule 10 is slidably journaled in a sleeve 11 permitting said rule to slide axially only in relation to said rail 9. The rule 10 has a higher portion changing abruptly at 12 into a lower portion and said latter portion is by rivets 13 secured to a zeroizing or clearing member 14, consisting of a wedge-shaped head 15 with two oblique edges which are continued by a rear portion having parallel sides. As is evident from Fig. 5 the member 14 may have a curved cross-section, by preference, concentric with the shaft 1 and the pin-wheels 4, 5. The member 14 is slidable a certain distance in the axial direction together with the locking rule 10 and at this motion the member 14 slides on the lower side of the rail 9.

The non-slidable rail 9 is provided with a long axial recess or slot 16, in which the lower portion of the locking rod 10 may slide to and fro. Across said slot a pin 17 is secured in the rail 9 and on said pin a locking arm 18 is rotatably journaled. The higher part 18a of said arm 18 has the same shape as that of the locking rule 10 and may be said to form a continuation thereof. The outer or left end of said locking arm 18 (Fig. 2) is immediately to the right of the projection 12, when the parts are not actuated for a zeroizing operation.

The parts 9, 10, 14 and 18 directed axially extend through recesses or apertures of the wheels 4 and the disks 5. Because said parts 9, 10, 14 and 18 cannot be rotated in relation to the shaft 1, as is evident from the statements above, the apertures of the wheels 4 (Fig. 5) may simply have a shape exactly corresponding to the cross-section of the parts 9, 10, 14, 18, but the disks 5 must be rotated in relation to said parts and to the shaft 1 (and the carriage 3) at the teeth-setting operation and for this purpose the recesses or apertures 19 (Fig. 5) through the disks 5 must have a shape permitting said rotary setting motion. At the outer circular periphery of said holes 19 ten notches 20 are cut, whose angular distances from each other (i. e. whose center angles) exactly correspond to the angular distances of the ten setting positions (for the numerals 0, 1, 2, 3, -9) of the pin-wheel or the disk 5, i. e. the zero or initial position and the nine different positions in which one, two, three, -nine teeth are set in operative position. The aperture 19 has substantially the shape of a sector of a circular ring whose center angle is approximately equal to that of the member 14. In front of the lateral edges of said member 14 flaps or offsets 21 are bent out from the disks 5,

On the wedge 14 a reversing sleeve 22 is secured. When moved to the left in Figs. 1-4 this sleeve will rock the locking arm 18 in such manner that the part 18a is lowered (i. e. approached to the shaft 1). The sleeve 22 also serves (just as the sleeve 11) to guide the members 10 and 14 riveted together so that they will move in a rectilinear path along the rail 9.

The right end 18b of the locking arm 18 extends through recesses or apertures in the member 14 and the disk 8 (Figs. 1-4 and 7) and engages with its upper edge a curved guiding surface or cam on the stationary arm 23 secured to the machine frame A. In the initial position of the main shaft 1, i. e. when the operating handle B assumes its position of rest as shown in Fig. 2, said handle being normally locked in this position by a spring-pressed catch-pin, said part 18b is just opposite (below) the highest portion (i. e. the portion at the longest distance from the shaft 1) of the curve of the arm 23. When the main shaft 1 is rotated in either direction the part 18b will be engaged by either of the lower portions or shoulders 24 of said curve (Fig. 6) and thus pressed down, if it were not already depressed in advance (i. e. at a prior rotation of the handle B). The part 18b and consequently also the whole locking arm 18 is latched in its lowermost position (Fig. 4) as well as in its uppermost position (Fig. 2) by a spring pressed ball 25 in the rail 9, said ball cooperating with an edge on the part 18b, as seen from the drawings. This spring-pressed latching mechanism shall be so strong that it can be released only by the considerable rocking moment from the sleeve 22 or the projections 24, respectively, but not by casual shocks or stresses which may be at hand during the operation.

A restoring spring 26 is placed between the disk 8 and the zeroizing wedge 14 to restore the latter to its initial position after the clearing operation is completed.

As seen from Figs. 1, 2, 3 and 7 the right end of the wedge 14 projects on one side at 27 through a hole in the disk 8 to cooperate with an arm 29 rotatably journaled on the journal 28. The arm 29 carries a pin 30 engaging the curved surface of a member 31, which may be rotated through an angle by use of the zeroizing lever 32, rotatably journaled in the machine frame A and rigidly connected with the member 31.

In the periphery of the disk 8 an incision 33 is made which may be engaged by an arm or lever 35 rotatably journaled on the stationary pin 34, which is fixed to the machine frame. When the arm 35 engages the incision 33 the disk 8 and consequently also the main shaft 1 and the handle B are locked. The arm 35 carries a pin 36, which is raised by cams on the member 31 on the zeroizing lever 32 when the latter is rotated from its position of rest to effect the clearing operation (Fig. 7). In a bore in an angle iron secured to the stationary machine frame A a pin or bolt 38 is slidably journaled, whose motion in one direction is limited by an annular flange 38a. This journal consists of two parts of different diameters and also projects through an oblong aperture 39 of the arm 35 and carries at its outer (in Fig. 8: left) end a disk 40 slidable in the axial direction and a fixed disk 41, a helical spring 42 being placed between said two disks. A pin 41a serves to fix the disk 41 to the pin 38. Between the arm 35 and the machine frame A a spring 43 is placed tending to draw the arm 35 downwards.

The device described acts as follows:

Figs. 1 to 3 show the position of the different parts during the setting operation. The curve slot disk 5 which is just immediately to the right of the shoulder 12 of the locking rule 10 is free to rotate, because the left end 18a of the locking arm 18 is depressed as a result of the clearing operation made immediately before the setting operation. Consequently, the end 18a does not engage the notches 20 and the disk 5 in question can be set either directly by hand or by a keyboard mechanism in any well-known or suitable manner. It is to be observed that the head or point of the wedge 15 is secured so much to the right of the shoulder 12 as corresponds to the (axial) width of a disk 5 and consequently said wedge does not hinder the setting of the disk 5 just mentioned. After said disk has been duly set the pin-wheel rotor, i. e. the carriage 3 with the pin-wheels 4, 5, is moved one step to the left (in Figs. 1-3), thus causing the shoulder 12 to enter the corresponding notch 20 laterally, i. e. in the axial direction. Now the locking rule 10 keeps said disk 5 locked in the position set. At this stepping motion the next disk 5 is moved into the setting position immediately to the right of the shoulder 12 and may thus be set and locked in exactly the same manner. This operation is repeated until the desired number of pin-wheels have been set. The pin-wheels (curve slot disks) on the locking rule 10 are thus set and locked in the position set, while the pin-wheels on the locking arm 18 are still not set, i. e. are in their zero position.

During the calculating operations which in well-known manner are effected by rotating the main shaft 1 in either direction and by displacing the carriage 3 with the pin-wheel rotor axially in either direction to cause the pin-wheels to co-operate with intermediate pinions C and numeral wheels D of the counters, it is necessary to lock the unlocked disks 5 on the locking arm 18 in their position (zero position). It is obvious from Figs. 3 and 5 that the disks engaged by the parallel edges of the member 14 are always effectively locked, because the projections 21 engage the member 14 from both sides and thus keep the corresponding disks 5 in their middle position (zero position). But the three disks 5 immediately to the right of the shoulder 12 (Figs. 1-4) i. e. just laterally of the wedge-shaped portion 15, or in other words the disk just in position to be set and the two disks next to the right of it, are free to rotate more and less and must be locked separately so as to avoid miscalculations. This locking is effected by the locking arm 18, whose part 18b is depressed by the projections 24 as soon as the main shaft 1 is rotated at the beginning of the calculating operation. The arm 18 is rotated simultaneously and its part 18b is engaged by said projections 24 to be depressed and is further latched in its depressed position by the ball latching device 25 and remains latched during the calculation until clearing is made. The opposite end 18a of the locking arm 18 is thus rocked upwards to snap into the notches 20 corresponding to the zero position of said three disks and locks the latter. The locking rule 10 and the part 18a of the locking arm 18 together with the parallel edges of the member 14 thus form a cohering locking device serving to lock all the disks 5 in their position during the rotations of the shaft 1 together with the pin-wheel rotor 3, 4, 5 and also during the axial motion of said pin-wheel rotor on the shaft 1. Figs. 1 to

3 show the different parts in the locked position. The locking is effected as soon as the calculation begins and is not released until the clearing is made.

After the calculating operations are finished the machine is cleared again by turning the zeroizing lever 32 by hand. The maximum stroke of this lever is limited in both directions by stops E secured to the machine frame A. The motion of the lever 32 will then turn the arm 29 a certain angle to the left (Figs. 1-4), i. e. counter-clockwise and said arm will push the zeroizing wedge 14, 15 a distance to the left which is equal to the total axial width of three pin-wheels. This motion of the member 14 to the left also moves the reversing sleeve 22 to the left to depress the left end 18a of the locking arm 18 against the action of the ball locking device 25, said sleeve being rigidly connected with said member 14. Simultaneously the whole pin-wheel rotor together with the carriage 3 is released and returned to its right end position, for instance, by the action of the spring G (Fig. 2). This releasing and returning motion is thus effected in the manner described in detail in the co-pending U. S. patent application Serial No. 431,872 but may also be effected in any other manner well-known in the art, for instance by hand. The relative motion of the pin-wheel rotor 3, 4, 5 in relation to the zeroizing member 14, 15 thus effected by the motion of the member 14 to the left and the returning motion of the pin-wheel rotor to the right causes the head of said wedge 15 to enter the corresponding apertures 19 of all the disks 5. The projections 21 of those of said disks which are in advance of their zero position will then be engaged by either of the oblique edges of said wedge 15 so that all of said disks are zeroized and kept in this position by the parallel edges of the member 14. This position is shown in Fig. 4. The maximum angular rotation of the disks 5 in either direction at the setting operation (viz for the numerals 4 and 9) is limited in such manner that the point of the wedge 15 will always be able to enter the apertures 19, when said axial displacement of said wedge and said disks in relation to each other takes place.

After all the disks 5 have been zeroized and engage the parallel edges of the member 14 with their shoulders 21, which is the case when the zeroizing lever 32 is checked by the stop E, said lever is restored by its restoring spring and the arm 29 is released. Now the spring 26 restores the member 14 and consequently also the arm 29 to their original positions. Thus, the member 14 and the locking rule 10 are returned a distance to the right which corresponds to the total width of three pin-wheels, so that the first disk, i. e. the uttermost left disk, is just to the right of the shoulder 12. The part 18a of the arm 18 remains locked in its depressed position by the action of the ball locking device 25. The individual setting of the disks 5 may then be effected again in the manner described.

As soon as the clearing operation begins, the pin-wheel rotor and consequently also the operating handle of the calculating machine are locked by the actuation of the members 33-43. This locking is not released until after the zeroizing operation is finished. As soon as the lever 32 is rotated to effect the clearing the lever 35 is raised by the cams of the member 31 (Fig. 7) against the action of the spring 43, thus permitting the thicker portion of the bolt 38 to snap into the aperture 39 of this arm under the action

of spring 42. Then the lever 35 remains in its raised position even if the lever 32 is restored to its initial position before it has completed its stroke, because the spring 42 keeps the bolt 38 in its new position. The arm 35 engages the notch 33 when raised and thus effects the locking desired and this locking is not released until the clearing is completed by a full stroke of the zeroizing lever. Then the carriage 3 together with the pin-wheel rotor 4, 5 is restored to their extreme right position (for instance by spring G), as stated above, and this carriage or a buffer F secured thereto will strike upon the left end (Figs. 2 and 8) of the pin 38. In the embodiment shown (Fig. 2) the buffer F is secured to a fork which engages the carriage 3 and serves to move said carriage along the main shaft 1. The restoring spring G for the carriage may be secured between said fork and the machine frame A. The buffer F presses the thicker end of this pin back into the part 37 so that the lever 35 is depressed by the spring 43 to the position shown in Fig. 8 and releases the disk 8. Thus, the clearing operation must be completely finished before any calculating operations can be made. Miscalculations and breaking of the machine on account of incorrect positions of the pins 4a are thus eliminated.

Instead of the common disk 31 from which the locking of the main shaft and also the clearing motion are derived, two different disks on the journal of the clearing lever 32 may be used.

It is also obvious that the device in accordance with this invention may be used not only in connection with setting means to be set in two opposite directions, as described, but also for clearing members to be set in one direction only, such as the pin-wheels of the ordinary machines of the Odhner type or the step-shaped pinions of the Baldwin and Thomas types. In this case the wedge 15 may, of course, have one oblique edge only.

The device in accordance with this invention may also be used, when the members actuating the numeral wheels are not slidable in the axial direction, and one or more of the counters (results counter and revolutions counter) are placed on a slidable carriage, as is usual in machines of the Odhner, Baldwin, and Thomas types. The relative motion of the setting means in relation to the zeroizing wedge must in this case be effected exclusively by the motion of the latter, whose stroke then must be lengthened so as to extend across all said setting members to enable the wedge to zeroize all of them. It is also evident that the setting or actuating means may be set in any well-known or suitable manner whatever, for instance by hand, by a keyboard having 9 or 81 keys. Said members may also be locked in the position set by any means whatever.

It is also obvious that the wedge 14, 15 might be slidably journaled on a stationary portion of the machine frame, so that said wedge does not follow the rotations of the pin-wheels.

What I claim is:—

1. In a calculating machine, in combination, a shaft, a member including a set of rotatable elements on said shaft adapted to be set for actuating numeral wheels, said rotatable elements having apertures, a wedge-shaped member, and means for displacing at least one of said members substantially in the direction of said shaft to cause said wedge-shaped member to enter said apertures to restore said rotatable elements to their original position.

2. In a calculating machine, in combination, rotatable members adapted to be set for actuating numeral wheels, said rotatable members having apertures, a wedge-shaped member having at least one oblique edge, guides engaging said wedge-shaped member to guide it to a motion substantially in the direction of the axis of rotation of said rotatable actuating members, and means for displacing said wedge-shaped member in said guides to engage the edges of said apertures by its oblique edges in order to zeroize at least some of said rotatable actuating members.

3. In a calculating machine, in combination, rotatable members adapted to be set for actuating numeral wheels of a counter, a wedge-shaped member having at least one oblique edge, two parallel edges on said wedge-shaped member, said rotatable actuating members having apertures of the same width as that of said wedge-shaped member, and means for effecting a relative displacement between said wedge-shaped member and said rotatable actuating members substantially in the direction of the axis of rotation of said rotatable members to engage the edges of said apertures successively by its oblique and parallel edges.

4. In a calculating machine, in combination, rotatable pin-wheels adapted to actuate numeral wheels of a counter, cam disks connected with said pin-wheels to set the pins thereof, said cam disks and said pin wheels having apertures, a wedge-shaped member having at least one oblique edge, and means for displacing said wedge-shaped member on one hand and said pin-wheels and cam disks on the other hand in relation to each other to cause said oblique edges to engage the edges of said cam disks to restore the latter to their original position.

5. In a calculating machine, in combination, a member including a set of rotatable elements adapted to be set for actuating numeral wheels, said rotatable elements having apertures, a wedge-shaped member having at least one oblique edge and two parallel edges, said parallel edges being at a distance from each other equal to the width of said apertures, means for displacing at least one of said members in relation to the other substantially in the direction of the axis of rotation of said rotatable elements to cause said wedge-shaped member to enter said apertures, a rocking arm connected with said wedge-shaped member, and said rotatable actuating elements having notches to be engaged by said arm in one of its positions in order to lock those of said rotatable actuating elements which are on said oblique edge.

6. In a calculating machine, in combination, a member including rotatable elements adapted to be set for actuating numeral wheels, said rotatable elements having apertures, a wedge-shaped member having at least one oblique edge and two parallel edges, said parallel edges being of a distance from each other equal to the width of said apertures, means for displacing at least one of said members axially to cause said wedge-shaped member to enter said apertures, a rocking arm connected with said wedge-shaped member, a ball latching device for preventing said rocking arm from being rocked unintentionally, said rotatable actuating elements having notches, and means for rocking said arm to engage and disengage said notches.

7. In a calculating machine, in combination, a main shaft, on said shaft a member including a set of rotatable elements adapted to be set for

actuating numeral wheels, said rotatable elements having apertures, a guide rigidly secured to said main shaft, a wedge-shaped member slidably connected with said guide, and means for displacing
5 at least one of said members in relation to the other substantially in the direction of said main shaft to cause said apertures to be engaged by said wedge-shaped member.

8. In a calculating machine, in combination, a
10 main operating shaft, a handle connected with said shaft, a member including rotatable elements on said shaft adapted to be set for actuating numeral wheels, said rotatable elements having apertures, a guide rigidly secured to said main shaft
15 and extending through said apertures, a wedge-shaped zeroizing member slidably journaled on said guide, and means for displacing at least one of said members in relation to the other to cause said wedge-shaped member to enter said apertures to
20 clear said rotatable elements.

9. In a calculating machine, in combination, a member including rotatable elements adapted to be set for actuating numeral wheels, said rotatable elements having apertures, a wedge-shaped
25 member having at least one oblique edge and two parallel edges, said parallel edges being at a distance from each other equal to the width of said apertures, means for displacing at least one of said members in relation to the other substantially in the direction of the axis of rotation of said rotatable elements to cause said wedge-shaped member to enter said apertures, a rocking arm connected with said wedge-shaped member, a ball latching device for preventing said arm from being rocked
30 unintentionally, said rotatable actuating elements having notches, a stationary guide curve to rock said rocking arm to disengage said notches, and means connected with said wedge-shaped member for rocking said arm to disengage said notches.
40

10. In a calculating machine, in combination, a main operating shaft, a handle connected with said shaft, a member including a set of rotatable elements on said shaft adapted to be set for actuating numeral wheels of a counter, said rotatable
45 elements having apertures, a guide rigidly secured to said main shaft and extending through said rotatable elements, a wedge-shaped zeroizing member slidably journaled on said guide, means for displacing at least one of said members axially
50 along said main shaft to cause said zeroizing member to enter said apertures, a rocking arm journaled on said guide, a ball latching device for preventing said arm from being rocked unintentionally, said rotatable elements having notches,
55 a stationary guide curve to rock said rocking arm to engage said notches as soon as said handle is rotated, and a sleeve on said zeroizing member enclosing said rocking arm to disengage the same from said notches, when said zeroizing member is displaced.
60

11. In a calculating machine, in combination, a main shaft, a handle connected with said main shaft, rotatable members on said main shaft adapted to be set for actuating numeral wheels, said rotatable members having apertures, a guide secured to said main shaft, a wedge-shaped member having at least one oblique edge and slid-
65 able along said guide, means for displacing said wedge-shaped member a distance along said guide equal to the axial length of said oblique edges, and means for restoring said rotatable members axially along said shaft to cause said wedge-shaped member to enter said apertures.
70

12. In a calculating machine, in combination, a member including rotatable elements adapted

to be set for actuating numeral wheels, said rotatable elements having apertures, a wedge-shaped member, means for displacing at least one of said members substantially in the direction of the axis of rotation of said rotatable
80 elements to cause said wedge-shaped member to enter said apertures to restore said rotatable elements to their original position, and a spring to restore said wedge-shaped member.

13. In a calculating machine, in combination, 85 a member including a set of rotatable elements adapted to be set for actuating numeral wheels, said rotatable elements having apertures, offsets at the edges of said apertures, a wedge-shaped member having at least one oblique edge, and means for displacing at least one of said members substantially in the direction of rotation of said rotatable elements to cause said oblique edges to engage said offsets successively to clear
90 said rotatable elements. 95

14. In a calculating machine, in combination, a main operating shaft, a handle connected with said shaft to rotate the latter, a member including a set of rotatable elements on said shaft adapted to be set for actuating numeral wheels, said rotatable elements having apertures, a wedge-shaped member, means for displacing at least one of said members in relation to the other to cause said wedge-shaped member to enter said apertures, a disk rigidly secured to said shaft, 105 said disk having a notch, and a locking arm operatively connected with said wedge-shaped member to engage said notch as soon as said wedge-shaped member is actuated.

15. In a calculating machine, in combination, 110 a main operating shaft, a handle connected with said shaft to rotate the latter, a member including rotatable elements on said shaft adapted to be set for actuating numeral wheels, said rotatable elements having apertures, a wedge-shaped member, means for displacing at least one of said members in relation to the other along said main operating shaft to cause said wedge-shaped member to enter said apertures, a disk rigidly secured to said shaft, said disk
115 having a notch, a locking arm operatively connected with said wedge-shaped member to engage said notch, said arm having an oblong slot, a pin entering said slot to lock said arm, when the latter is moved to engage said notch, a buffer
120 connected with said rotatable elements to depress said pin from said slot, and a spring acting on said arm to disengage the same from said notch.

16. In a calculating machine, in combination, 130 a main operating shaft, a handle connected with said shaft to rotate the latter, rotatable members on said shafts adapted to be set for actuating a counter, said rotatable members having apertures, a wedge-shaped zeroizing slide, an arm
135 engaging one end of said slide, a rotatable cam disk engaging said arm, and a lever secured to said cam disk to rotate the same to cause said slide to enter said apertures for zeroizing at least some of said rotatable members. 140

17. In a calculating machine, in combination, a main operating shaft, a handle connected with said shaft to rotate the latter, rotatable members on said shafts adapted to be set for actuating a counter, a zeroizing device, a disk rigidly secured
145 to said shaft, said disk having a notch, a locking arm operatively connected with said zeroizing device to engage said notch, said arm having an oblong slot, a pin having two parts of different diameters and normally entering said slot with its
150

thinner part, a spring on said pin to cause the latter to enter said slot with its thicker part, when said arm is moved to engage said notch, a buffer connected with said rotatable members
 5 to push said thicker part out of said slot, when the zeroizing is completed, and a second spring acting on said arm to disengage the same from said notch.

18. In a calculating machine, in combination,
 10 a main operating shaft, a handle connected with said shaft to rotate the same, a carriage slidable on said shaft, rotatable pin-wheels on said carriage adapted to be set for actuating numeral wheels, an axial guide rigidly connected with said
 15 shaft, a zeroizing wedge slidable in said guide, said pin-wheels having apertures of a shape substantially corresponding to the cross-section of said wedge and guide, an arm engaging the rear end of said wedge to cause said wedge to engage
 20 said apertures for zeroizing said pin-wheels, a zeroizing lever to rock said arm, and a spring

secured to said carriage to move it along said main shaft for the zeroizing operation.

19. In a calculating machine, in combination, a rotary operating shaft, a carriage member slidable on said shaft, pin-wheels rigidly secured to
 80 said carriage member, cam discs operatively connected with said pin-wheels to set the latter for actuating numeral wheels, an axial guide rigidly connected with said shaft, a zeroizing wedge member slidable in said guide, said pin-wheels
 85 having apertures of a shape exactly corresponding to the cross-section of said wedge member and guide, said cam discs having sector-shaped apertures of a width substantially equal to the width of said wedge member, and means for dis-
 90 placing at least one of said members substantially in the direction of said shaft to cause said wedge member to engage said apertures to restore said cam discs to their original position.

BENGT CARLSTRÖM. 95

25	100
30	105
35	110
40	115
45	120
50	125
55	130
60	135
65	140
70	145
75	150