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W. S. JOHNSON

CALCULATING MACHINE

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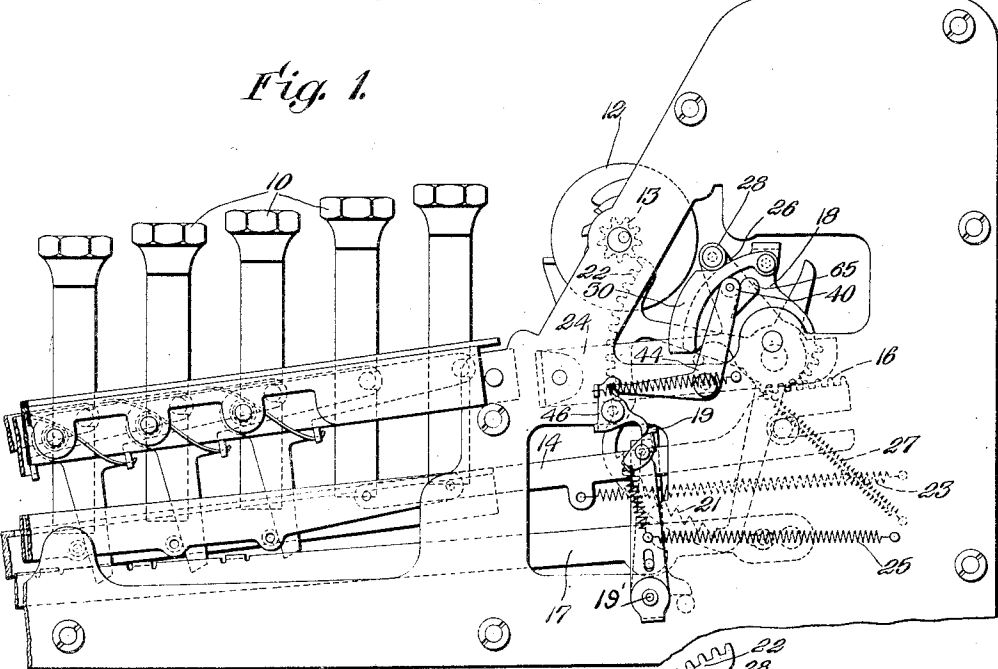


Fig. 2.

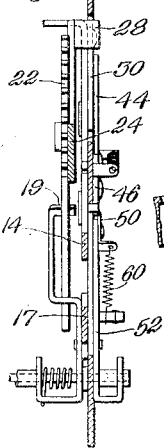


Fig. 3.

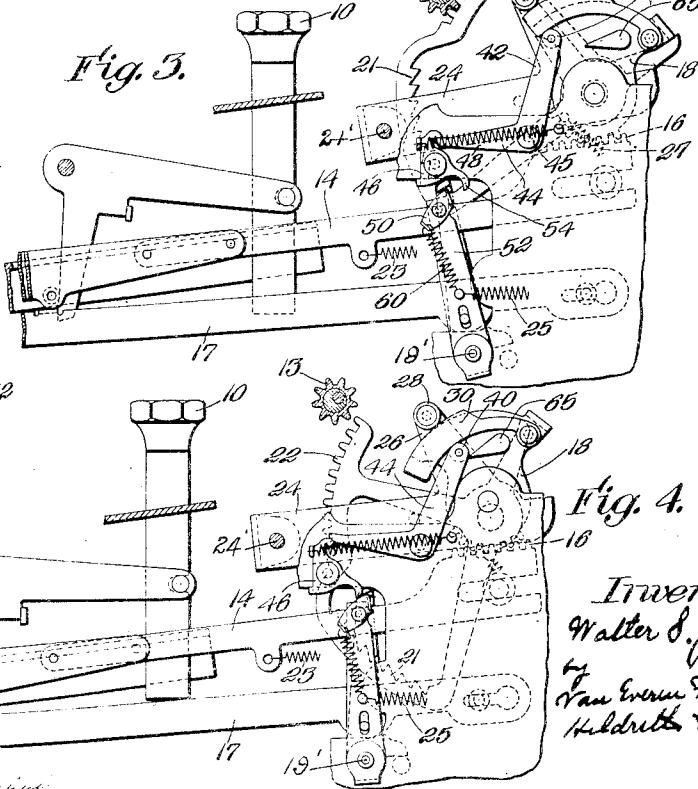


Fig. 4.

Witness:
Alfred H. M. G. H. H.

Inventor:
Walter S. Johnson
by
Fann Emerson Fisher
Haldreth & Carey
Attys.

UNITED STATES PATENT OFFICE.

WALTER S. JOHNSON, OF PROVIDENCE, RHODE ISLAND.

CALCULATING MACHINE.

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This invention relates to calculating machines.

In calculating machines of the general type illustrated in the patent to George C. Chase No. 1,329,262, dated January 27, 1920, the computing operation is performed by a series of computing wheels arranged to be actuated upon depression of a series of operating keys. The actuating mechanism as well as the key, is returned to an initial position by return springs after each computing operation. In performing the computing operation the operator is required to exert sufficient pressure upon the key not only to overcome the frictional resistance offered by the actuating mechanism and computing wheels, but also sufficient additional pressure to overcome the return springs, with the result that because of the stiffness required of the springs as heretofore employed, the calculating machines all had relative hard key movement.

The object of the present invention is to provide a calculating machine having an easier and more desirable key movement.

In the drawing illustrating the preferred embodiment of the invention Fig. 1 is an elevation of the right-hand side of the calculating machine; Figs. 2 and 3 are end and side elevations respectively of the mechanism for actuating one of the computing wheels; and Fig. 4 is a side elevation showing the actuating mechanism in a different position of operation.

The mechanism of each section of the calculating machine illustrated in the drawing for performing the computing operation includes a series of keys 10, a number wheel 12, and connections between the keys and number wheel whereby depression of one of the keys causes rotation of the number wheel. The connections between the keys and number wheel include a slide bar 14 having a rack 16 engaging teeth upon a cam member 18. The number wheel 12 is provided with a pinion 13 into engagement with which an actuating segment 22 is adapted to be moved so as to thereafter cause rotation of the pinion and number wheel as the actuating segment is moved. The actuating segment 22 is pivoted upon an oscillatory bell crank 24 pivoted at 24', one arm 26 of the bell crank being provided with a cam roll 28 adapted to be lifted during the first part of the key depression by a cam 30 pivoted upon the cam member 18. A second slide bar 17 is arranged beneath the slide bar 14 and upon movement toward the front of

the machine operates to throw a locking pawl 19 pivoted at 19' into engagement with the teeth of a ratchet 21 upon the lower portion of the actuating segment 22 in order to prevent over-rotation or spinning of the number wheel 12. The slide bars 14 and 17 together with the keys 10 are returned to an initial position after a key depression by returning springs 23, 25 cooperating with the racks. The actuating segment 22 is returned to an initial position by a return spring 27. The parts thus far described, with the exception of the cam 30, are of the same general construction and have the same mode of operation as the corresponding parts in the calculating machine of the above mentioned Chase patent.

At the end of the key depression the actuating segment 22 and associated parts occupy the position illustrated in Fig. 3, in which the actuating segment 22 is in engagement with the pinion 13 upon the number wheel 12, being held in such position by the pivoted cam 30, the lower surface of which rides upon a cam roll 40 upon the upper end of an arm 42 of a bell crank 44 pivoted upon the frame at 45. The bell crank 44 is held, during the depression of the key 10, in a stationary position to support the cam 30 in its movement by a spring latch 46 in engagement with the tip of the second arm 48 of the bell crank.

In order to decrease the frictional resistance offered to the return springs 23, 25 and 27 so that return springs of lighter construction may be used for the purpose of diminishing the power required to be exerted by the operator to depress the key 10 during the computing operation, provision is made for permitting the actuating segment 22 to become disengaged from the pinion 13 at the start of the return movement of the key 10 after a depression thereof, to thereby permit the actuating segment 22 to be more easily returned to an initial or starting position by the spring 27. In this manner the release of the actuating segment 22 at the beginning instead of at the end of the return stroke of the operating key 10 gives a greater length of time within which the return spring 27 may act, so that a correspondingly lighter spring may be used. For this purpose the latch 46 which has held the bell crank 44 stationary during the key depression, is lifted from engagement with the tip of the second arm 48 of the bell crank. This is accomplished at the beginning of the return movement of the key by the engagement of a dog 50 upon the

end of an oscillatory pawl 52 with a finger 54 upon the lower portion of the latch. The pawl 52 and dog 50 are swung to the right, viewing Fig. 3, by movement of the second or lower rack bar 17 under the influence of the spring 25 at the beginning of the return or upward movement of a key 10 after a depression thereof. The release of the bell crank 44 operates to permit the actuating segment 22 to become disengaged from the pinion 13, and immediately thereafter the cam member 18, cam roll 40, cam 30 and actuating segment 22 are moved from the position illustrated in Fig. 3 to that shown in Fig. 4 by the return spring 27. It will therefore be apparent that the frictional resistance of present constructions offered by the segment 22 as it engages the pinion 13 is eliminated and a lighter spring 27 may be used. The decrease in the frictional resistance enables springs of lighter construction to be used throughout so that a calculating machine embodying the present invention has a much easier key movement than prior constructions of such machines.

After the latch 46 has been lifted and the bell crank 44 released, the actuating segment 22 immediately drops, returning to its initial position. During the remaining portion of the return movement of the key, the rack bar 17 and the pawl 52 remain practically stationary in the position illustrated in Fig. 4 and the pawl 52 is reset by movement to the left upon movement of the rack bar 17 to the left upon the next key depression. A coil spring 60 enables the dog 50 to turn sufficiently during the resetting operation to permit the tip of the finger 54 to ride over the end thereof.

During the latter part of the return movement of the key, the bell crank 44 is returned to an operative position such as is illustrated in Figs. 1 and 3, in which the tip of the second arm 48 thereof is engaged by the latch 46 and in which the cam roll 40 is in position to cause the cam 30 to be lifted upon the next key depression. For this purpose the cam member 18 is provided with a small cam 65 projecting therefrom which is adapted to engage the cam roll 40 to oscillate the bell crank 44 to the left thus positioning the parts, as shown in Fig. 1, in readiness for the next key depression. Then as the next key is depressed the actuating segment 22 is forced into engagement with the pinion 13 through the action of the cam 30 and the actuating segment is thereafter rotated to perform the computing operation.

Having thus described the invention what is claimed is:—

1. A calculating machine having, in combination, a computing wheel, a series of keys, an actuating segment, connections permitting movement of the actuating segment into engagement with the computing mechanism

upon depression of one of the keys, supporting means for maintaining said connections in position to hold the segment in engagement with the computing mechanism during depression of the key, means for releasing the supporting means at the beginning of the return movement of the key to disengage the segment from the computing mechanism, and means for effecting a simultaneous independent return of the key and the segment.

2. A calculating machine having, in combination, a computing wheel, a series of keys, an actuating segment, connections permitting movement of the actuating segment into engagement with the computing mechanism upon depression of one of the keys, supporting means for maintaining said connections in position to hold the segment in engagement with the computing mechanism during depression of the key, means for releasing the supporting means at the beginning of the return movement of the key to disengage the segment from the computing mechanism, and means for restoring the supporting means to operative position upon return of the parts to their original positions.

3. A calculating machine having, in combination, a computing wheel, a series of keys, actuating means for the computing wheel, connections between the keys and the actuating means for moving the latter into engagement with the computing wheel upon depression of a key, means permitting disengagement of the actuating means from the computing wheel and from said connections at the beginning of the return movement of the key, and return springs for simultaneously and independently returning the actuating means and the key after disengagement of the former from the computing wheel.

4. A calculating machine having, in combination, a computing wheel, means for actuating the computing wheel including a series of keys, a pinion connected to the computing wheel, an actuating segment, a member adapted to be moved upon depression of the key, a cam pivoted upon said member, means cooperating with said cam for causing the actuating segment to engage the pinion and to rotate it, and means for releasing said cam to permit the segment to be disengaged from the pinion at the beginning of the return movement of the key.

5. A calculating machine having, in combination, a computing wheel, a series of keys, a pinion connected to the computing wheel, an actuating segment, a cam member adapted to be moved upon depression of the key, a cam pivoted upon the cam member for raising the actuating segment into engagement with the pinion, a lever for normally holding the cam in position to engage the actuating segment, and means operated upon the beginning of the return move-

ment of the key for releasing the lever to allow the actuating segment to drop out of engagement with the pinion.

5 6. A calculating machine having, in combination, a computing wheel, a series of keys, a pinion connected to the computing wheel, an actuating segment, a cam member adapted to be moved upon depression of the key, a cam pivoted upon the cam member for raising the actuating segment into engagement with the pinion, a bell crank lever having an end engaging the under side of the cam, a latch engaging the bell crank lever in a manner to hold the cam normally in position to engage the actuating segment, and a slide operated by the keys and adapted to move the release latch and allow the actuating segment to drop out of engagement with the pinion upon the beginning of the return movement of the key.

20 7. A calculating machine having, in combination, computing mechanism, a series of keys, actuating means for the computing mechanism, means for moving the actuating means into engagement with the computing mechanism upon depression of a key, means including a latch for maintaining the actuating means in engagement with the computing

mechanism during depression of the key, means for tripping the latch to disengage the actuating means from the computing wheel at the beginning of the return movement of the key, and independent means for simultaneously returning the actuating means and the key after disengagement of the former from the computing mechanism.

8. A calculating machine having, in combination, computing mechanism, a series of keys, actuating means for the computing mechanism, means for moving the actuating means into engagement with the computing mechanism upon depression of a key, means including a latch for maintaining the actuating means in engagement with the computing mechanism during depression of the key, means for tripping the latch to disengage the actuating means from the computing wheel at the beginning of the return movement of the key, independent means for simultaneously returning the actuating means and the key after disengagement of the former from the computing mechanism, and means for resetting the latch at the end of the return movement.

WALTER S. JOHNSON.