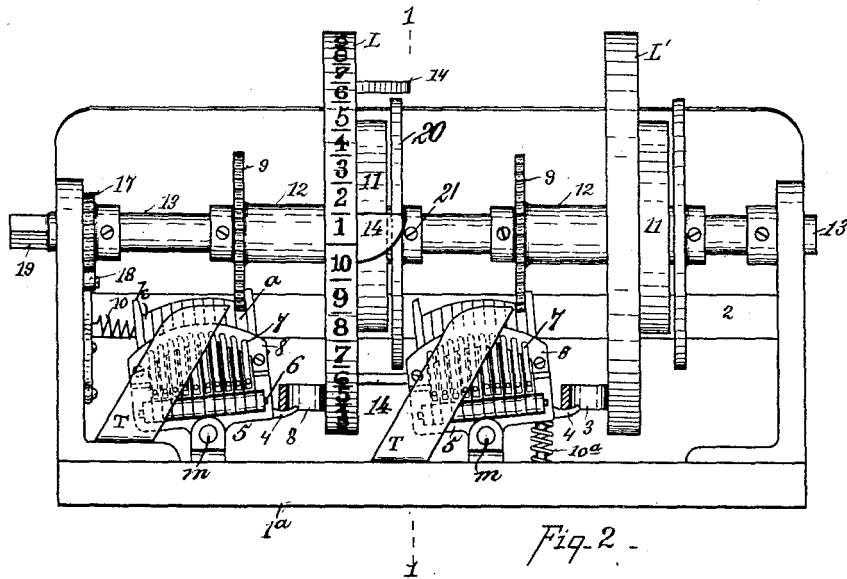
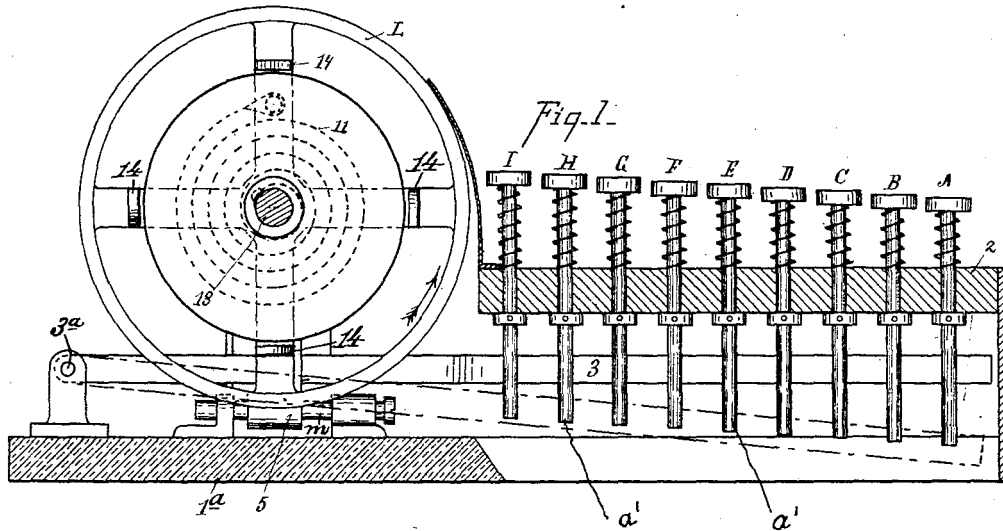


W. M. McCAFFERTY.
CALCULATING MACHINE.

No. 478,885.

Patented July 12, 1892.



Attest—
C. W. Miles
T. Simmons

Inventor—
William M. McCafferty
 By his Attorneys *Wood & Bond*

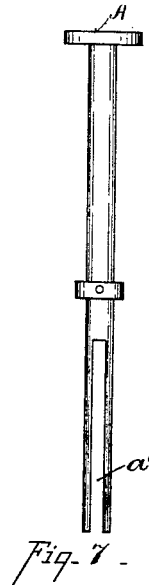
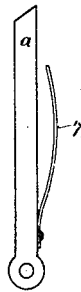
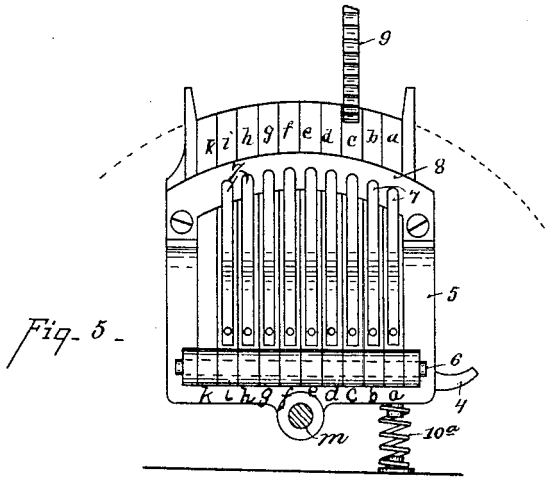
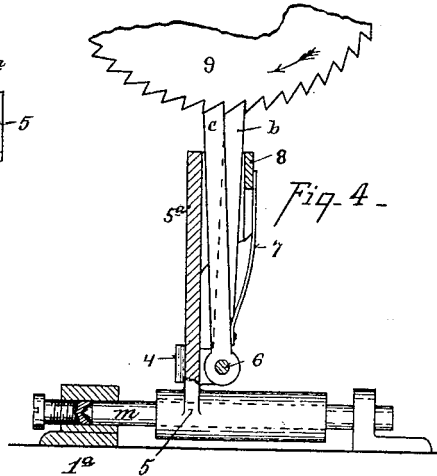
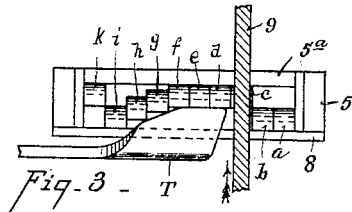
(No Model.)

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UNITED STATES PATENT OFFICE.

WILLIAM M. McCAFFERTY, OF MOUNT STERLING, OHIO.

CALCULATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 478,885, dated July 12, 1892.

Application filed December 22, 1891. Serial No. 415,883. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM M. McCAFFERTY, a citizen of the United States, residing at Mount Sterling, in the county of Madison and State of Ohio, have invented certain new and useful Improvements in Calculating-Machines, of which the following is a specification.

This invention relates to calculating or adding machines, and has for its object to provide novel means for moving a numeral-bearing wheel a predetermined distance by the depression of a key.

To accomplish this object my invention involves the features of construction and the combination or arrangement of devices hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a sectional view taken on the line 1 1, Fig. 2, showing sufficient of a calculating or adding machine to illustrate my invention. Fig. 2 is a sectional elevation of the same. Fig. 3 is a top plan view of the oscillatory pawl-box, showing a portion of the ratchet-wheel in section and also showing the cam which presses the pawls laterally. Fig. 4 is a detail sectional elevation of the machine. Fig. 5 is a detail elevation of the pawl-box, showing a portion of the ratchet-wheel. Fig. 6 is a detail view of one of the pawls, and Fig. 7 is a detail view of one of the keys.

In order to enable those skilled in the art to make and use my invention, I will now describe the same in detail, referring to the drawings, wherein—

1^a indicates the base of the frame on which the apparatus is mounted, 2 the keyboard, and A, B, C, D, E, F, G, H, and I the nine keys mounted upon the key-board and provided with bifurcated extremities *a'*, Fig. 7, which embrace a lever 3, pivoted at one end, as at 3^a, so that any one of the keys may be used to depress the lever. The lever rests upon a lug 4, Fig. 2, attached to the oscillatory pawl-box 5, which is mounted on a shaft or axle *m*. The pawl-box is provided with a series of pawls *a b c d e f g h i k*, all of which are mounted on a single shaft

6 near the base of the pawl-box, and each pawl, except pawl *k*, is provided with a retractile spring 7 for retracting the pawl back into its normal position. The pawl-box comprises a front plate 5^a and a rear cross-bar 8, Figs. 3, 4, and 5, and the upper free extremities of the springs 7 bear against the cross-bar 8, while the upper extremities of the pawls are located between the front plate 5^a and the said cross-bar. The pawls are adapted to engage a ratchet-wheel 9, forming a part of or attached to a sleeve 12, which is mounted on the shaft 13. The sleeve 12 also carries a numeral-bearing wheel L, having lateral projections 14 and adapted to be rotated through the medium of a convoluted spring 11, one end of which is secured to the shaft 13 and the opposite end to the wheel L. The convoluted spring is retained in proper position relatively to the numeral-bearing wheel by a disk 20, rigidly secured to the shaft 13 by a screw 21. The convoluted spring 11 has a tendency to constantly rotate the ratchet-wheel 9 and wheel L in the direction of the arrows, Figs. 1, 3, and 4, and the power of this convoluted spring is greater than the power of any one of the springs 7, so that on the back-stroke of the pawl-box the engaging a pawl will press the latter from the bar 8 to the front plate 5^a, as will hereinafter be obvious.

T, Figs. 2 and 3, indicates a cam, the forward end of which projects forward over the pawl-box at one side of the ratchet-wheel and holds the several pawls in their forward position, causing them to engage successively with the same tooth of the ratchet-wheel, so that the entire series of pawls as they are moved in one direction are prevented from releasing the ratchet-wheel when the pawl-box is rocked forward on its axis *m*, and they successively yield one notch during this movement of the pawl-box, so that each additional pawl allows one step movement of the ratchet-wheel as the pawl-box moves back into its normal position.

10, Fig. 2, indicates a retractile spring for holding the pawl-box, so that pawl *a*, Fig. 2, is normally in engagement with the ratchet-

wheel 9. When the key A is depressed, it moves the lever 3 and rocks the pawl-box a sufficient distance to bring the pawl *b* into engagement with one of the teeth of the ratchet-wheel, the pawl *a* being out of contact. When the pawl-box is released, by releasing the lever 3 and key A from pressure the retractile spring 10 draws the pawl-box back and the pawl *a* yields, thereby allowing the ratchet-wheel to move one step forward under the influence of the spring 11. The front plate 5^a, Figs. 3 and 4, arrests the forward movement of the pawls successively, and the cross-bar 8 arrests the rearward movement of the pawls, so that the pawls can move a distance forward and backward corresponding to one tooth of the ratchet-wheel. In like manner by depressing the key B the pawl-box is tilted or oscillated enough to bring the pawl *c* into engagement with the ratchet-wheel 9, the pawls *a b* having dropped back as they pass out of engagement, which is the position shown in Figs. 3, 4, and 5. When the lever is released, the spring 10 brings the pawl-box back, the pawl *b* yielding to allow the ratchet-wheel to move one step, and then the pawl *a* in like manner allowing it to move a second step. The depression of a third key would in like manner bring the pawl *d* into engagement with the ratchet-wheel, and when the lever is released the pawls *c b a* would successively engage the ratchet-wheel and yield to allow the said wheel to move three spaces. As the lever is depressed, the pawls are moved forward toward the front plate 5^a by the cam T of the pawl-box, and each pawl passes the given tooth without moving it; but as the pawl-box moves backward to its normal position each pawl successively engages with the succeeding tooth and then yields, owing to the power of the spring 11, thereby obtaining a step-by-step movement of the wheel L.

The shanks of the several keys A B C, &c., are slotted, as shown in Fig. 7, so that the pawl-lever 3 may be depressed by, say, the farthest key, as shown in dotted lines, Fig. 1, without affecting the movement of the individual keys in front thereof. The depression and release of key A permits the ratchet-wheel 9 to move one step. The depression and release of key B will permit the ratchet-wheel to move two steps, and likewise the depression and release of the other keys will permit the ratchet-wheel to move a corresponding number of steps, key I permitting it to move nine steps.

I have shown as the preferred form of driving secondary adding or carrying wheels a projection 14 upon the wheel L. When this wheel L has moved a predetermined distance—say, ten, one hundred, or one thousand—the projection 14 comes in contact with the pawl-box of the next adding or carrying wheel and moves it one notch and registers, say, one hundred or one thousand on the wheel L'. If it be desired to add more than ten, one hun-

dred, or one thousand, the keys of the succeeding wheel or wheels L' are used.

Any number or series of calculating appliances may be employed. Suppose the apparatus be intended to add tens and hundreds, three sets of pawl-boxes, keys, and levers will be required. Say you wish to register one hundred and twenty-five, the key corresponding to numeral "5" would be struck on the first or units series of registering-keys, then the key corresponding to "2" on the second or tens series, and "1" on the third or hundreds series. Each series of mechanism is independent of the other in its operation, and each is moved one notch by the projection 14 at each revolution of the preceding registering-wheel.

10^a, Fig. 2, represents an expansible spring for returning the pawl-box 5 of wheel L' to its normal position after being depressed by the lever 3. The sleeves 12 are mounted loose on the shaft 13, the shaft 13 being the means by which the spring 11 is wound after becoming uncoiled.

17 represents a ratchet-wheel on the shaft 13, engaged by spring-pawl 18 to prevent the springs 11 from uncoiling after being wound up.

19 is an angular portion, to which the winding-key is attached to wind the springs.

If the wheel L be provided with, say, four projections 14, as shown in Fig. 1, and the ratchet-wheel 9 has forty teeth, the periphery of the said wheel will be numbered from "1" to "10," inclusive, between every two projections.

Having thus described my invention, what I claim is—

1. In a calculating-machine, the combination, with the spring-impelled ratchet-wheel 9, of the oscillatory pawl-box 5, containing a series of pawls for successively engaging the ratchet-wheel, and lever mechanism for operating the pawl-box, substantially as described.

2. In a calculating-machine, the combination, with the spring-impelled ratchet-wheel 9, of the oscillatory pawl-box 5, provided with a series of spring-pressed pawls for successively engaging the ratchet-wheel, and a lever mechanism for operating the pawl-box, substantially as described.

3. In a calculating-machine, the combination, with the spring-impelled ratchet-wheel 9, of the oscillatory pawl-box 5, provided with a series of spring-pressed pawls for successively engaging the ratchet-wheel, the cam T for holding the pawls in their forward position, and a lever mechanism for operating the pawl-box, substantially as described.

4. In a calculating-machine, the combination, with the spring-impelled ratchet-wheel 9, of the oscillatory pawl-box 5, provided with a series of pawls for successively engaging the ratchet-wheel, the cam T, the wheel L, provided with a projection 14, the pivoted lever 3 for engaging a part of the pawl-box, and

means for operating the lever, substantially as described.

5 In a calculating-machine, the combination, with a spring-impelled ratchet-wheel 9, of an oscillatory pawl-box 5, provided with a series of pivoted spring-pressed pawls for successively engaging the ratchet-wheel, a pivoted lever 3 for engaging a part of the pawl-

box, and a series of keys for depressing the lever, substantially as described.

In testimony whereof I have hereunto set my hand.

WILLIAM M. McCAFFERTY.

Witnesses:

O. A. SPERRY,
A. L. HASTINGS.