

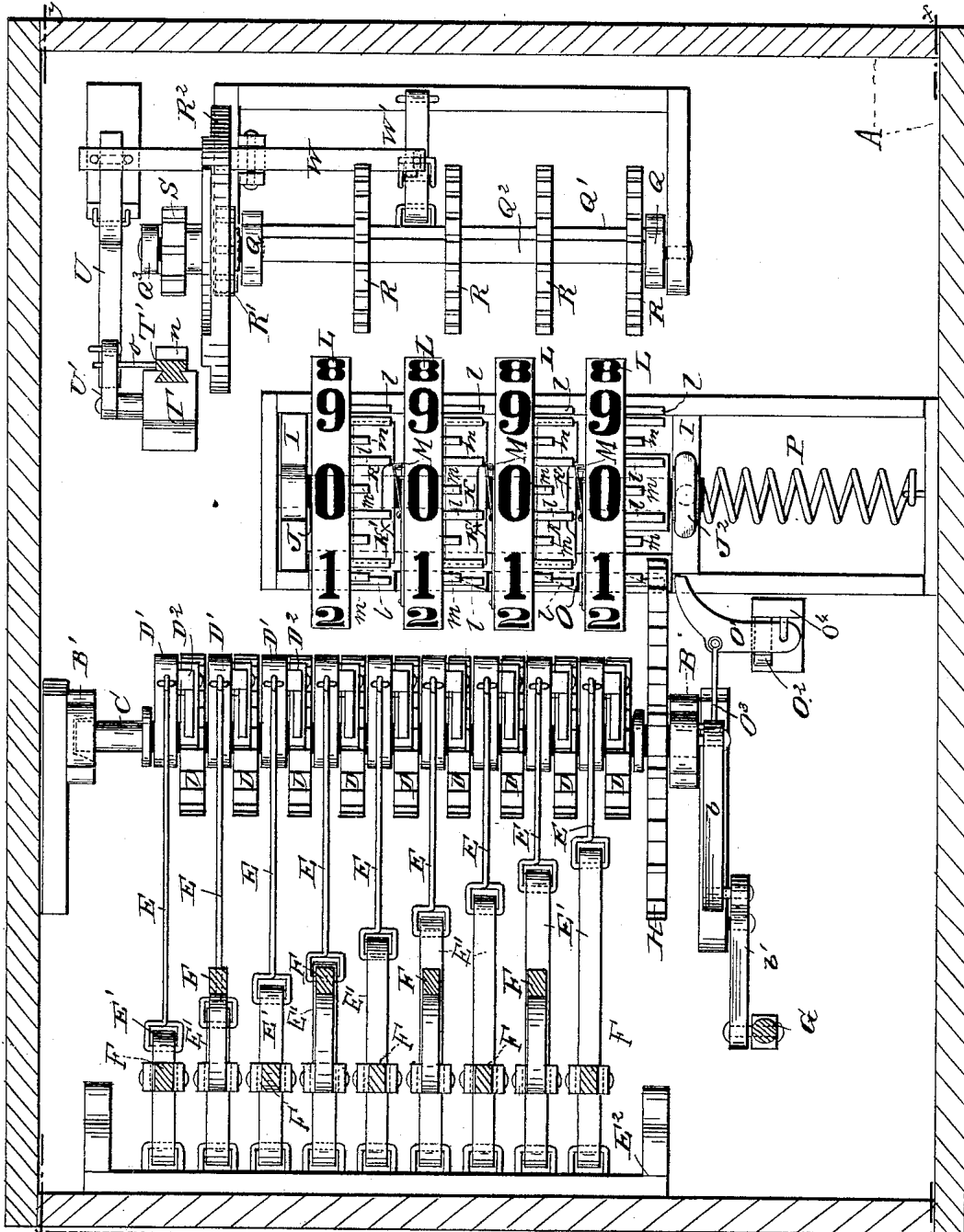
(Model.)

4 Sheets—Sheet 1.

W. J. MACNIDER.
ADDING MACHINE.

No. 322,190.

Patented July 14, 1885.



WITNESSES:

Wm. Buyer
C. Sedgwick

Fig. 1.

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ATTORNEYS.

(Model.)

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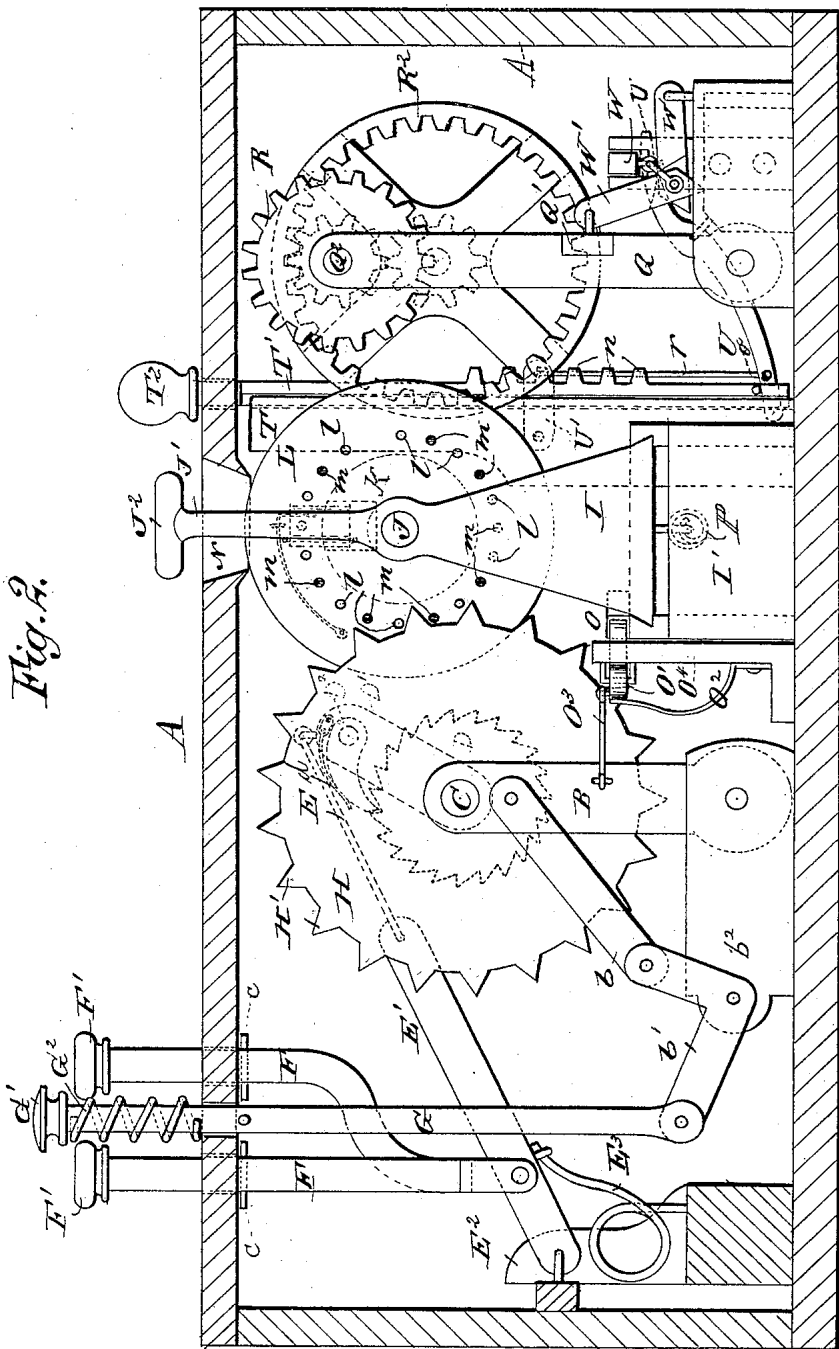


Fig. 2.

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(Model.)

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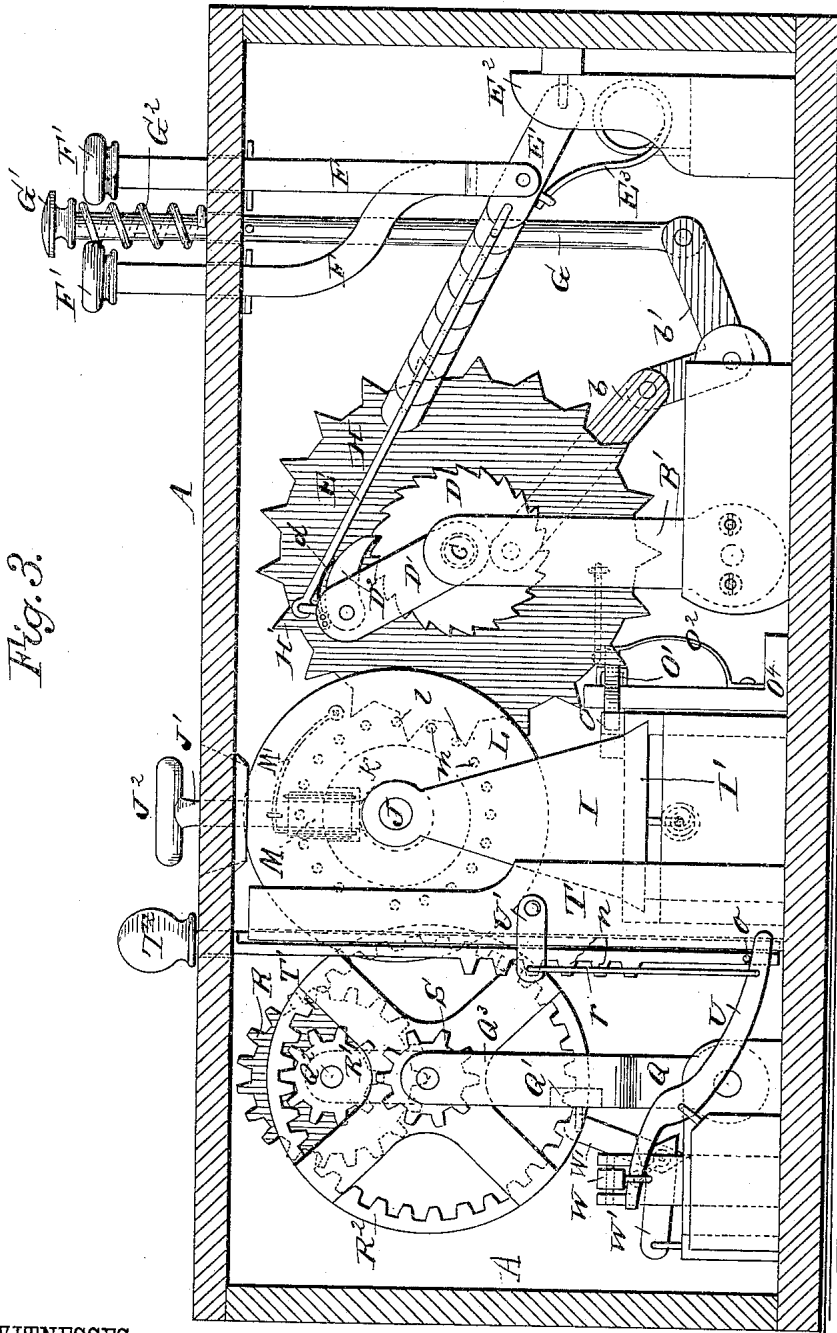


Fig. 3.

WITNESSES:

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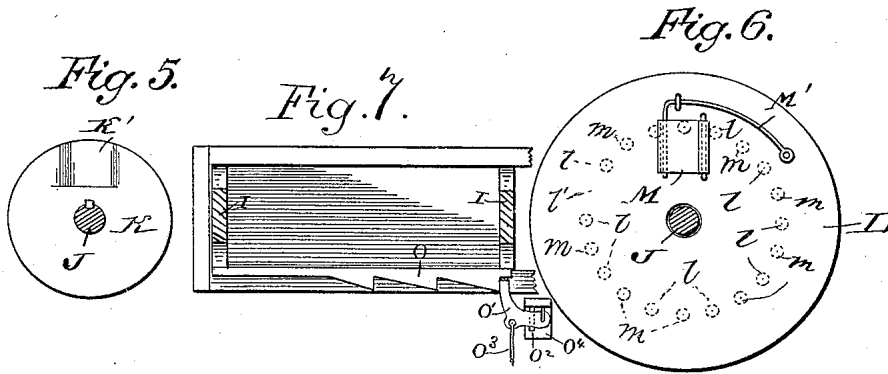
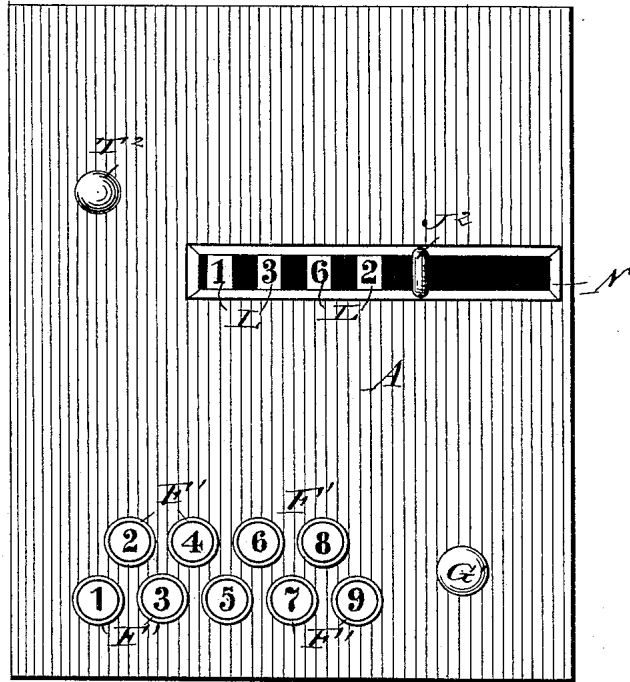
W. J. Macnider
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Fig. 4.



WITNESSES:
H. Beyer
C. Sedgwick

INVENTOR:
W. J. Macnider
 BY *Munn & Co.*
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UNITED STATES PATENT OFFICE.

WILLIAM J. MACNIDER, OF GREENSBOROUGH, GEORGIA, (QUINTIN MACNIDER ADMINISTRATOR OF SAID WILLIAM J. MACNIDER, DECEASED.)

ADDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 322,190, dated July 14, 1885.

Application filed September 6, 1884. (Model.)

To all whom it may concern:

Be it known that I, WILLIAM JOHN MACNIDER, of Greensborough, in the county of Green and State of Georgia, have invented a new and Improved Adding-Machine, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved machine by means of which columns of figures can be added very rapidly and accurately.

The invention consists in the combination, with a series of counting-wheels, of a toothed wheel adapted to engage with the counting-wheels, and mounted on a shaft having one end journaled in a swinging standard, which swinging standard is connected by a suitable lever with a push-pin, by means of which the toothed wheel can be swung toward and from the counting-wheels. The shaft on which the counting-wheels are mounted is journaled in a carriage adapted to slide transversely, and is provided with a handle-piece projecting through a transverse slot in the top of the box, a toothed wheel operated from a series of push-pins by ratchet-wheels, pawls, and levers being adapted to engage with the several counting-wheels and revolve them. The wheels are brought back to their normal position by means of a series of cog-wheels mounted on a swinging shaft, and adapted to engage with pins on the counting-wheels, the swinging shaft being swung by suitable devices toward the shaft carrying the counting-wheels at the same time that it is revolved.

The invention also consists in various parts and details and combinations of the same, as will be fully set forth and claimed hereinafter.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional plan view of my improved adding-machine. Figs. 2 and 3 are longitudinal sectional elevations of the same on the lines *xx* and *yy* of Fig. 1, respectively. Fig. 4 is a plan view on a smaller scale. Fig. 5 is a side view of one of the hubs. Fig. 6 is a side view of one of the counting-wheels. Fig. 7 is a plan view of the transversely-sliding carriage, the standards with the shaft and

counting-wheels being broken away to show the rack.

The entire mechanism is contained in a box, A, and on the upper surface of the bottom of the box a standard, B, is pivoted, near one side of the box, and at the other side a standard, B', is secured, in which standards a shaft, C, is mounted to turn, the opening in the standard B', being such as to permit the shaft C to swing slightly in the horizontal plane. On the shaft C are rigidly mounted nine ratchet-wheels, D, and adjoining each ratchet-wheel a lever, D', is mounted to rock on the shaft C, in each of which levers D' a pawl, D², is pivoted, which is pressed by a suitable spring, *d*, against the teeth of its wheel D. Each rocking or swinging arm or lever D' is connected by a wire, E, with an arm or lever, E', pivoted on a suitable standard, E², and pressed upward by a spring, E³. The wires E and the levers E' are of different lengths, so that from the same vertical throw of the different levers E' the ratchet-wheels D connected therewith will be turned different distances, the ratchet-wheel D of the first lever being thrown only one-ninth of the distance that the ratchet-wheel of the ninth lever is thrown. From the several levers E' rods or push-pins F project upward through the top of the box A, and are provided at their upper ends with suitable heads, F', the rods F being provided below the top of the box with cross-pieces *c*, forming checks to prevent the rods or push-pins F from being thrown upward too far. The push-pins F and their heads F' are arranged in two rows, the even numbers being in one row and the odd numbers in the other row. The numbers corresponding to the several levers are produced on the heads F', as shown in Fig. 4. The rocking or pivoted standard B is connected by a lever, *b*, with one end of an elbow-lever, *b'*, pivoted at its elbow on a block, *b*², on the bottom of the box, in the other end of which elbow-lever a rod or push-pin, G, is pivoted, which projects up through the top of the box, and is provided on its upper end with a head, G'. A spiral spring, G², surrounds the rod or push-pin G above the top of the box, and presses the same upward. On the shaft C a wheel, H, is rigidly mounted, which is provided on its rim with

triangular or other teeth H'. Two standards, I, united by a suitable bottom-plate, are held to slide transversely on a support, Y, in the bottom of the box, and in the said standards a shaft, J, is journaled, on which a series of hubs, K, are rigidly mounted, each hub being provided with a recess, K', in one side and at the rim, the recesses being shown in side view in Fig. 5 and in top view in Fig. 1. Adjoining each hub a wheel, L, is loosely mounted on the shaft J, each wheel L being provided with a circular row of ten pins, *l*, projecting over the hub K corresponding to the wheel, and between the ten pins *l* nine shorter pins, *m*, are arranged so that an open or blank space, *l'*, will be left between two of the longer pins. On that surface of each wheel L opposite the one from which the pins project a pawl, plate, or dog, M, is pivoted, the free end of which is connected with a spring, M', secured on the side of the wheel, and throwing the outer end of the said pawl, plate, or dog M outward, so that when it comes opposite to the recess K' in the hub the said pawl or dog can enter the recess and engage with the long pins *l* of the adjoining wheel L. The spring M' is a pressure-spring, which is secured to the wheel at two points, and has one end bent rectangularly, the bent end resting against the pawl and being adapted to throw the same outward from the side of the wheel. From one of the standards I an arm, J', projects upward through a transverse slot, N, in the top of the box, and is provided at its upper end with a handle, J². The slot N is so arranged that it is directly over the shaft J. On the rim of each wheel L the numbers from 1 to 0, inclusive, are produced. A rack, O, is formed on the front edge of the board or plate uniting the standards I, and against the said rack a pawl, O', is pressed by a spring, O², the said pawl being pivoted on a suitable standard, O³, projecting upward from the bottom of the box A. A wire, O⁴, connects the pawl O' with the swinging standard B. A spring, P, connected with one of the standards I, pulls the frame formed by the standards and their bottom connecting-plate toward the right. In the rear part of the box two standards, Q, are pivoted on the bottom of the box to swing in a vertical plane, and are united by a cross-piece, Q', and by a shaft, Q², journaled in the top of the standards Q. On the shaft Q² are mounted as many cog-wheels, R, as there are wheels L on the shaft J, the said wheels R being adapted to pass in between the wheels L and engage with the long and the short pins *l m* on the said wheels L. On one end of the shaft Q² is mounted a pinion, R', adapted to engage with an internal gear-wheel, R², pivoted upon one of the standards Q and an arm, Q³ of the same, the said internal gear-wheel, R', being connected by a fixed sleeve or cam or otherwise with a pinion, S. In an upright guide or standard, T, a bar, T', is held to slide vertically, the said bar projecting through the top of the box and being provided at its upper end with a head, T².

On the bar T' a rack, *n*, is formed, and from the lower end of the said bar a pin, *o*, projects. A lever, U, pivoted on the bottom of the box has one end connected by a wire, *v*, with a lever, U', pivoted on and projecting from the standard T. The other end of the lever U is connected with a lever, W, whose opposite end is connected with the middle of a toggle-lever, W', having one of its ends connected with the bottom of the box or a frame on the same, and the other end with the cross-piece Q' uniting the rocking standards Q.

The operation is as follows: The rods or push-pins F are all depressed the same distance and throw the corresponding levers, E', through the same arc; but as the lengths of the several levers E' vary, the rocking arms or levers D' connected therewith by the several wires E will be thrown different distances. For instance, if the push-pin marked 2, Fig. 4, is depressed, the wheel H will be revolved the distance of two teeth, and if the push-pin marked 8 is depressed, the wheel H will be revolved the distance of eight teeth, and so on. For instance, if the numbers 2, 1, 5, and 3 are to be added, the pins marked 2, 1, 5, and 3 are depressed successively, whereby the wheel H is moved the distance of eleven teeth, and as its teeth engage with the long pins *l* of the first wheel L the said wheel will be revolved the distance of eleven teeth or pins. When the first wheel L has been revolved the distance of ten teeth, its pawl, plate, or dog M, coming in line with the recess in the hub, is swung outward by the spring M' and passes into the notch K' of the adjoining hub K, and thus engages with a pin, *l*, of the adjoining or second wheel L, thereby turning the second wheel the distance of one space, so that the number 1 will show on the second wheel and 1 will show on the first wheel through the slot N. As the first column amounted to eleven, the first wheel L is no longer required, and must be shifted out of use. To accomplish this, the push-pin or rod G is pressed downward, whereby the standard B is swung from the shaft J, and the wheel H is disengaged from the first wheel L, and at the same time the pawl O' is disengaged from the rack O for a short time, thus permitting the spring P to pull the carriage in which the shaft J is journaled to the right, the handle J² being used to hold the carriage at the distance of one tooth, whereby the wheel H will be engaged with the second wheel L. As soon as the carriage has been shifted the standard B is swung to the front again. As the second wheel has been moved the distance of one tooth or pin *l*, or one number on the periphery of the wheel, and the numeral 1 of the second wheel shows through the slot N, the one which is usually carried from the eleven need not be carried, as this was done automatically. The second column is added in a like manner, and when completed the adding-wheels are again shifted, and so on.

I have shown only four adding-wheels, but

as many as may be desired may be provided. The result will at all times show through the slot N in the top of the box. After the sums have been added, and the parts of the adding-machine are to be brought back into their original normal positions, the carriage carrying the shaft J is pushed to the left by means of the handle J² until the wheel H can again engage with the first wheel L. The adding-wheels L are always to be so adjusted that the zeros may show through the slot N. To accomplish this, the rod T' is pulled upward and the pin o' strikes the arm U', thereby pulling upward the front end of the arm U and downward the rear end, whereby the end of the lever W connected with the arm U will be forced downward, and the end connected with the toggle-lever W' is moved upward, whereby the standards Q and the parts on them will be swung toward the shaft J and the wheels R on the shaft Q² will be engaged with the pins l and m. By pressing the rod T downward the rack n, which is now engaged with the pinion S, by swinging the standards Q toward the shaft J revolves the said pinion, and by means of the intermediate gearing revolves the shaft Q² and the cog-wheels R thereon. The said cog-wheels revolve the wheels L, and as each wheel L is provided with a blank space between two long pins l the cog-wheels R can only revolve the wheels L until the cogs of the wheels R have come opposite to the blank spaces. The blank spaces are all so arranged that when the cogs of the wheels R arrive at the same all the wheels L show zero through the slot N. As the rod T' is pushed downward its pin o strikes the front end of the lever U and presses the same downward, thereby pressing the rear end upward and pressing the middle of the toggle-lever downward, whereby the standards Q are swung from the shaft J and the wheels R thus disengaged from the pins on the wheels L. The machine is now ready for operation.

I have shown the toothed wheel H on one end of the shaft C and the push pin or rod G in a corresponding position; but, if desired, the wheel H can be arranged on the middle of the shaft C and the heads F' of the several push pins or rods F arranged at both sides of the rod G.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an adding-machine, the combination, with a series of counting-wheels having numbers on their rims, of a toothed wheel for operating the counting-wheels, a series of ratchet-wheels on the shaft of the toothed wheel, swinging arms on the said shaft, pawls on the swinging arms, operating levers, wires or rods connecting said levers with the pawls, and of push-pins connected with the said levers and projecting from the top of the box containing the mechanism, the said operating levers and the wires connecting them with the swinging arms carrying the pawls being of different

lengths, substantially as herein shown and described.

2. In an adding-machine, the combination, with a transversely-sliding carriage carrying a shaft and the counting-wheels mounted thereon, of a toothed wheel adapted to engage with the counting-wheels, a series of ratchet-wheels on the shaft of the toothed wheel, swinging arms mounted on the said shaft, pawls on the swinging arms, vertically-swinging levers, wires or rods connecting said levers with the pawls, and a series of push-pins connected with the said levers and projecting from the top of the box containing the mechanism, whereby the toothed wheel can be revolved, substantially as herein shown and described.

3. In an adding-machine, the combination, with a transversely-sliding carriage carrying a shaft on which counting-wheels are mounted, of a toothed wheel adapted to engage with the several counting-wheels and revolve them, ratchet-wheels, pawls, and levers for operating the toothed wheels from a series of push-pins projecting from the top of the box containing the mechanism, and of a handle-piece projecting upward from the sliding carriage through a transverse slot in the top of the box, substantially as herein shown and described.

4. In an adding-machine, the combination, with a series of counting-wheels, of a toothed wheel adapted to engage with the counting-wheels and mounted on a shaft, a rocking standard in which one end of the shaft is journaled, an elbow-lever connected with the rocking standard, and a push pin or rod projecting from the elbow-lever upward through the top of the box containing the mechanism, substantially as herein shown and described.

5. In an adding-machine, the combination, with a series of counting-wheels, of a toothed wheel adapted to engage with the counting-wheels, a shaft on which the toothed wheel is mounted, a rocking standard in which one end of the shaft is journaled, and of devices for swinging the said standard from the shaft carrying the counting-wheels, substantially as herein shown and described.

6. In an adding-machine, the combination, with a transversely-sliding carriage carrying a shaft on which counting-wheels are mounted, and on which carriage a rack is formed, of a pawl pressed against the rack, a toothed wheel for revolving the counting-wheels, a shaft on which the toothed wheel is mounted, a rocking standard in which one end of the shaft is journaled, a push-pin connected by suitable levers to the rocking standard, a pawl resting against the rack formed on the above-mentioned transversely-sliding carriage, and a wire connecting the rocking standard with said pawl, substantially as herein shown and described.

7. In an adding-machine, the combination, with a transversely-sliding carriage carrying a shaft on which counting-wheels are mounted, of a spring for drawing the carriage toward

one side of the box containing the mechanism, a rack formed on the base of the carriage, a pawl pressed against the said rack, a swinging standard in which one end of a shaft is journaled, the said shaft carrying a toothed wheel for operating the counting-wheels, levers connected with the swinging standard, a push-pin connected to said levers, and a wire connecting the swinging standard with the pawl pressed against the rack formed on the base of the carriage, substantially as herein shown and described.

8. In an adding-machine, the combination, with a shaft, of a series of hubs, K, mounted rigidly on the shaft and each provided in one side with a recess, K', a series of wheels, L, mounted loosely on the shaft adjacent to the hubs K, which wheels are each provided with a series of laterally-projecting pins, l, which project over the adjacent hub, the pawl-plates M, hinged on those sides of the wheel L opposite the ones from which the pins l project, and the springs M', fastened to the side of the loose wheels and acting on the free end of the pawl-plates M, substantially as herein shown and described.

9. In an adding-machine, the combination, with a series of counting-wheels mounted on a shaft, each counting-wheel being provided on one side with ten long pins and with nine short pins between them, of a swinging shaft, a series of cog-wheels mounted on said shaft and adapted to be engaged with the pins on the counting-wheels, and of devices for revolving the cog-wheels, thereby turning all the counting-wheels back into their original positions, substantially as herein shown and described.

10. In an adding-machine, the combination, with a series of counting-wheels mounted on a shaft, each counting-wheel being provided on one side with ten long pins and with nine short pins between them, of the wheels R, the shaft Q², on which said wheels are mounted, the swinging standards Q, in which said shaft is pivoted, the rod T', the lever U, the lever W, and the toggle-lever W', substantially as herein shown and described.

11. In an adding-machine, the combination, with a series of counting-wheels mounted on a shaft, each counting-wheel being provided on one side with ten long pins and with nine short pins between them, of the wheels R, the shaft Q², on which said wheels are mounted, the swinging standards Q, in which said shaft is journaled, the pinion R', on one end of the shaft Q², the internally-cogged wheel R², engaging with the pinion R', and the pinion S, united with the cog-wheel R², the vertically-sliding rod T', having the rack n, the levers U and W, and the toggle-lever W', substantially as herein shown and described.

12. In an adding-machine, the combination, with a series of counting-wheels mounted on a shaft, each counting-wheel being provided on one side with ten long pins and with nine short pins between them, of the wheels R, the shaft Q², on which said wheels are mounted, the swinging standards Q, in which said shaft is journaled, the pinion R', on one end of the shaft Q², the internally-cogged wheel R², engaging with the pinion R', the pinion S, united with the cog-wheel R², the vertically-sliding rod T', having the rack n, the levers U and W, the toggle-lever W', the pin o, the pivoted arm U', and the wire n', connecting the lever U with the swinging arm U', substantially as herein shown and described.

13. In an adding-machine, the combination, with a series of counting-wheels mounted on a shaft, each counting-wheel being provided on one side with ten long pins and with nine short pins between them, of a series of cog-wheels, a shaft on which said wheels are mounted, swinging standards in which the shaft is journaled, whereby the cog-wheels can be swung against the pins on the counting-wheels, and of a vertically-movable rod adapted to revolve the shaft carrying the cog-wheels, and at the same time to swing the said shaft toward the shaft carrying the counting-wheels, substantially as herein shown and described.

W. J. MACNIDER.

Witnesses:

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JOEL F. THURSTON.