

P. E. REESE.
 ADDING MACHINE.
 APPLICATION FILED AUG. 30, 1911.

1,044,690.

Patented Nov. 19, 1912.

3 SHEETS-SHEET 1.

FIG. 1.

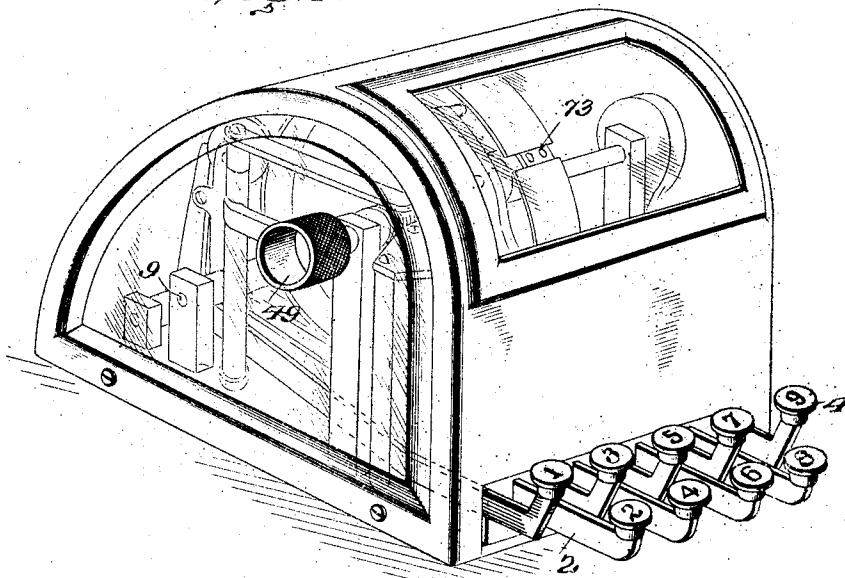
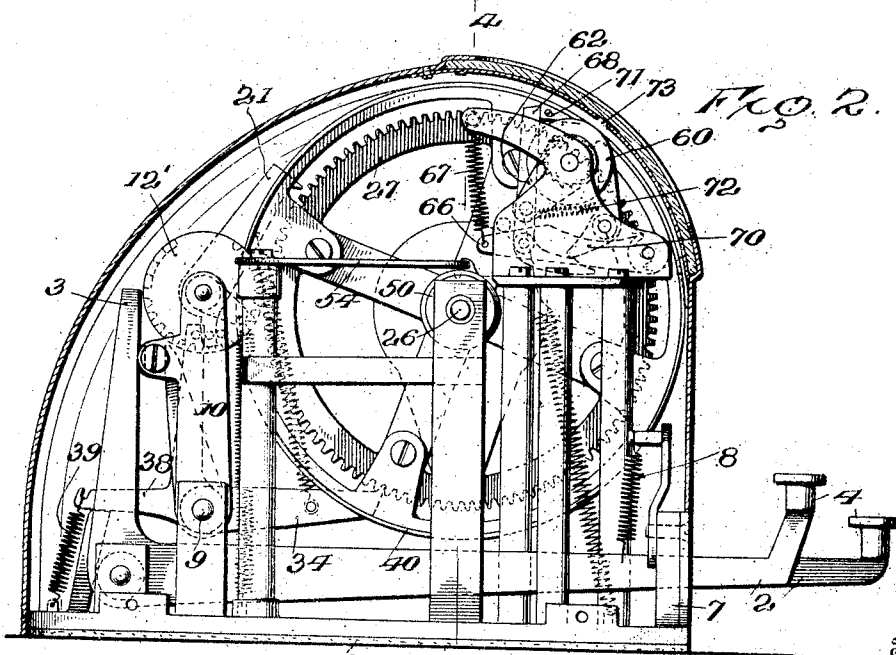


FIG. 2.



Inventor

Witnesses

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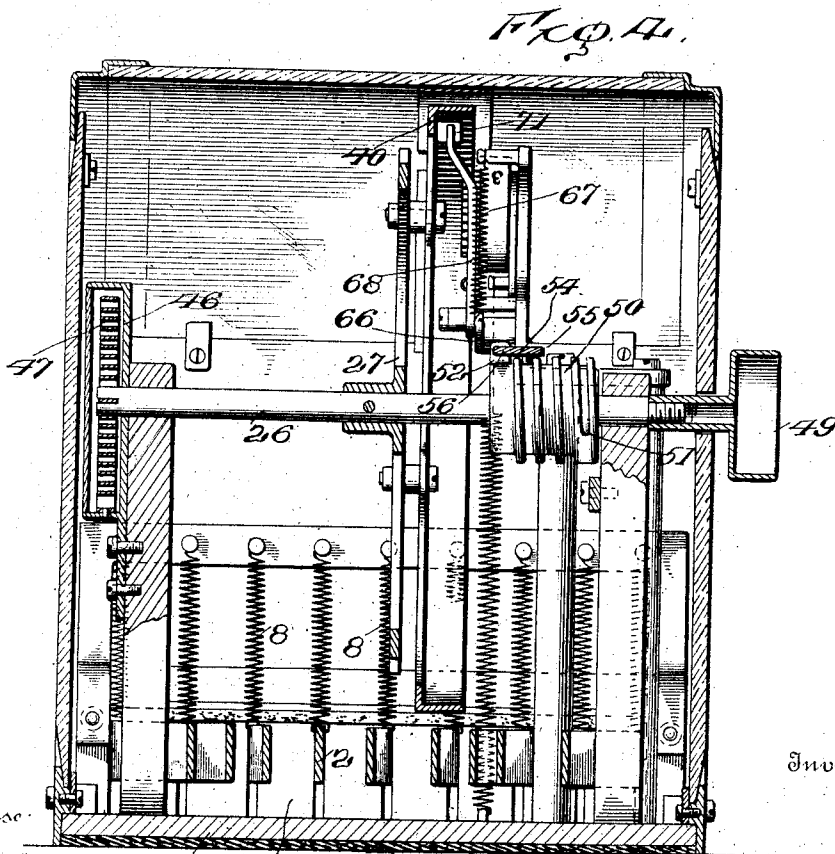
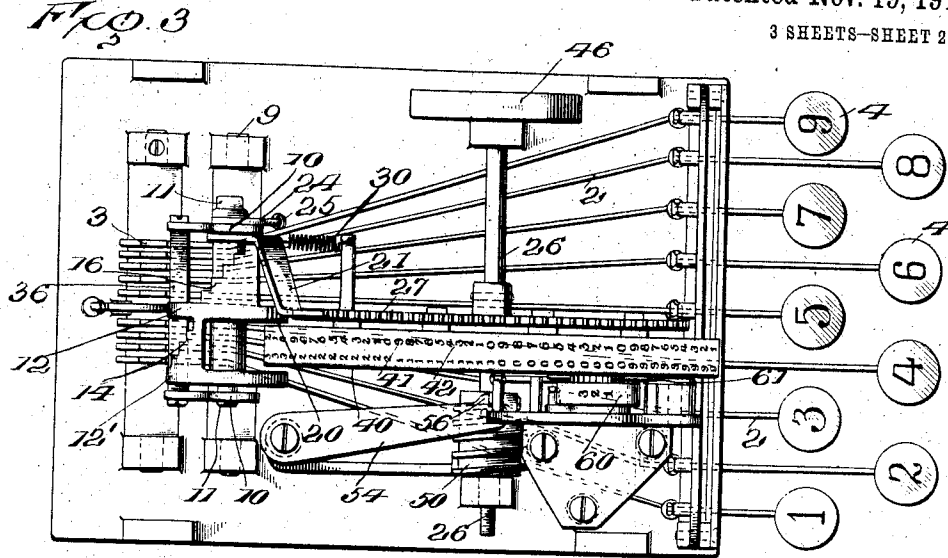
Attorney

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3 SHEETS—SHEET 2.



Witness

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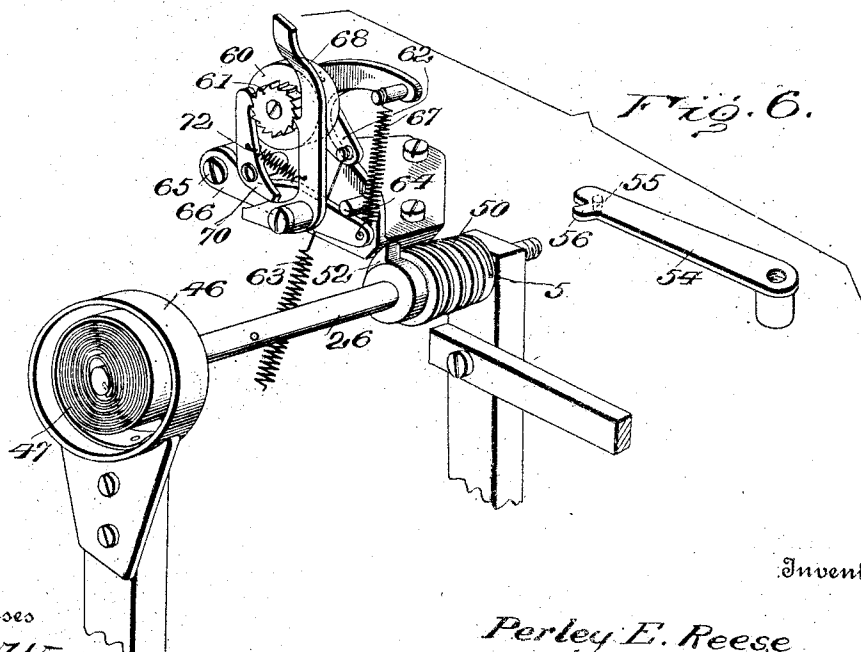
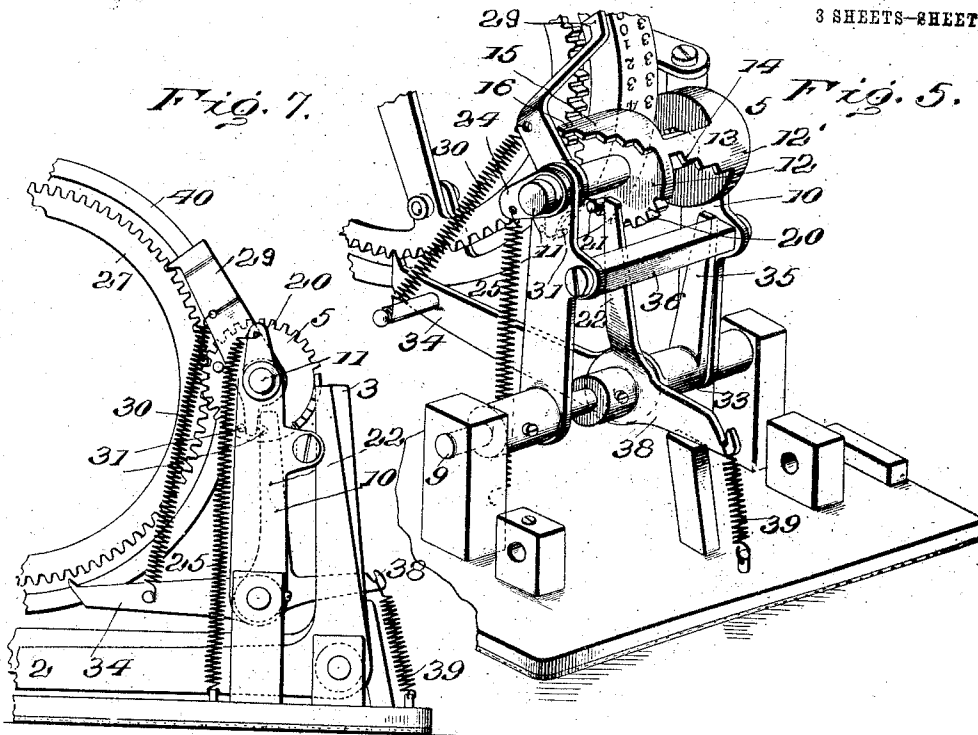
Attorney

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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

PERLEY E. REESE, OF KANSAS CITY, MISSOURI, ASSIGNOR TO WILLIAM C. RENFROW,
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ADDING-MACHINE.

1,044,690.

Specification of Letters Patent.

Patented Nov. 19, 1912.

Application filed August 30, 1911. Serial No. 646,892.

To all whom it may concern:

Be it known that I, PERLEY E. REESE, of Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Adding-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The primary object of this invention is to provide an extremely simple and inexpensive adding machine, composed of comparatively few parts and which will be positive in operation.

The invention will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in perspective. Fig. 2 is a side elevation with parts in section. Fig. 3 is a top plan view with the cover removed. Fig. 4 is a vertical sectional view on line 4-4, Fig. 2. Fig. 5 is a view in perspective of the escapement mechanism, parts being broken away and others omitted. Fig. 6 is a detached view of the "hundreds" carrying mechanism, the actuating shaft and resetting member. Fig. 7 is a view in side elevation, with parts broken away, and others omitted, showing the escapement mechanism in the position to which it is moved when a key is depressed.

Referring to the drawings, 1 indicates a base and 2 a series of key levers; preferably nine in number, fulcrumed on the base, each lever being of L-form, its short arm 3 being extended vertically to form a stop, and at the front end each lever carries a number 4. The upper ends of the vertical arms 3 are all in the same horizontal plane and when shifted cooperate with a differential gear 5 forming part of an escapement mechanism. The levers 2 are maintained in proper relative positions by a comb plate 7, and each lever is held in its normal position by a spring 8.

The escapement mechanism is pivotally mounted on a shaft 9, and comprises a pair of standards 10, which support a shaft 11, on which the differential gear 5 is mounted. This differential gear comprises two spaced-apart disks 12, 12', which are mounted on shaft 11. These disks are connected by a web 13, one edge of which is formed with

stepped notches 14 forming stops with which the upper ends of arms 3 of certain of the key levers cooperate to limit the movement of the differential gear. Projecting laterally from the disk 12 is a web or flange 15, likewise provided on one edge with stepped notches 16 forming stops with which cooperate the upper ends of arms 3 of the remaining key levers. All of the stepped notches 14 and 16 are in different transverse planes, the operative surface of each wall of the respective notches being uniformly spaced, the distance between such walls representing an equal fraction of the periphery of the numeral-wheel. The disk 12 is provided in its periphery with a segmental series of gear teeth 20, sufficient in number to allow the differential gear to be revolved to cause the outermost stop 16 to engage with the vertical arm of its respective key-lever. Projecting from the disk 12 is a pin 21 adapted to contact with an arm 22 on shaft 9 when the parts are in normal position. The shaft 11 has at one end an arm 24, to which is fastened a spring 25, for returning the differential gear to its normal position, upon reaching which the pin 21 engages arm 22.

26 is a horizontally-disposed power shaft to which is fixed a vertically-disposed gear wheel 27, the teeth thereof, as shown in the drawings, numbering one hundred. The gear wheel is in alinement with the disk 12 of the differential gear, and gear teeth 20 will mesh therewith to limit the extent of rotation of the vertically-disposed wheel 27 when a key lever is depressed.

Loosely mounted on the shaft 11 is a pawl 29, which engages gear wheel 27 when a key is depressed to prevent backward rotation. This pawl is normally drawn toward the gear wheel by a spring 30, and is limited in its movements by two pins 31, projecting from the inside of one of the standards 10, and between which an extension of the pawl is located. On shaft 9 is loosely mounted the hub 33 of a second pawl 34, which engages the gear wheel 27 to hold the latter against forward movement when out of mesh with the differential gearing. This pawl is so held in engagement with the gear wheel by spring 30. From the hub 33 extends a vertically-disposed arm 35 which lies in the plane of movement of a cross-bar 36

carried by the standards 10 of the escapement so that as the latter is moved forward to allow the differential gear to mesh with wheel 27 the pawl 34 will be disengaged from the latter. To an extension 38 of arm 22 is secured a coil-spring 39 the action of which through said arm bearing on bar 36 causing the escapement mechanism to move away from the gear wheel 27, allowing the differential gear to assume its normal position under the influence of spring 25.

Secured to the gear wheel 27 is an annular rim 40 provided on its periphery with a series of numerals comprising two rows, 41 and 42. The numerals of the two rows are arranged in alinement, and correspond to the number of teeth on the gear wheel, one row, 41, representing units and the other, 42, tens. The numerals of the units row are arranged in ten groups ranging each from "0" to "9," while the numerals of the tens row are arranged in groups of ten numbers of the same denomination, from "0" to "9." The motor is shown as comprising a fixed casing 46 and a spring 47 inclosed therein, one end of the spring being fastened to shaft 26, and the other end secured to the casing. The motor is intended to drive the power shaft counter-clockwise to progressively advance the numeral wheel according to the particular key-lever depressed. The power shaft carries a knob 49 by which it may be turned to rewind the spring. Also on this shaft 26 is a worm 50, the thread of which at one end has a stop 51, while at the opposite end of the worm is a second stop 52. A horizontally disposed arm 54 pivoted at one end carries at its free end a depending pin 55 which works in the worm, and also a laterally-extending lug 56 which upon being engaged by stop 52 limits the winding of the motor. The movement of the shaft in the opposite direction is limited by stop 51 engaging pin 55.

60 is the "hundreds" wheel, a segmental portion of the periphery of which is in line with the periphery of the gear wheel 27. On one side of this wheel is a ratchet 61, while from the other side projects an arm 62 to which is secured a spring 63 for holding said wheel against forward movement. At 65 I pivot to the frame supporting the wheel 60 an arm 66 which is normally drawn upwardly by a spring 67, its movement being limited by a stop 64. On the arm 66 is pivoted an L-shaped pawl 68, the vertical portion of which is formed with a tooth to engage the ratchet wheel 61 to periodically revolve the wheel 60, while the upper edge of said vertical portion is slightly off-set to extend under the rim 40 of the numeral wheel. The substantially horizontal arm of the pawl 68 is arranged in the path of the toe of a hold-back pawl

70 pivoted to the frame, and held in engagement with the ratchet wheel 61 by a spring 72. A cam 71 on the inner surface of the rim 40 is designed to cooperate with the off-set end of the L-shaped pawl 68 once in each revolution of the gear wheel 27 so as to advance the wheel 60 one step to represent the figures in a "hundreds" column.

The mechanism is inclosed within a suitable cover which is provided with an opening 73 through which the numerals may be viewed.

In operation, the knob 49 is turned in the direction of the arrow in Fig. 1 to wind the spring motor and to return the gear wheel to "zero," the stop 52 and flange 56 preventing overwinding of the motor and turning of the gear wheel beyond the desired point. During this operation the pawl 29 is out of engagement and the pawl 34 in engagement with the gear wheel, the pawl 34 allowing the wheel to readily ride over it in unwinding the spring. The device being ready for operation, the key levers representing the numerals to be added are depressed, for instance, levers 7, 8, 9, 4 and 3 and the total will, through the mechanism described, show opposite the opening 73. If amounts involving "units" and "tens" are to be added, for instance, 10 and 12, key levers bearing characters 9—1, and 9—3, or other combinations equaling the respective amounts, will be successively depressed, thereby showing the total opposite the opening in the case. Any two or more keys representing the total of a number, including a "unit" and a "ten," must be operated to add the various amounts.

When a key lever is operated, the vertical arm thereof contacts with the cross bar 36 and rocks the escapement mechanism forward on shaft 9, throwing the differential gear into mesh with the gear wheel. This also causes the pawl 29 to engage with the gear wheel to prevent rebounding thereof. The cross bar 36 contacts in its forward movement with the arm 35 and thereby disengages pawl 34 from the gear wheel, allowing the latter to revolve under the influence of the motor. The differential gear is also revolved until the respective stop thereof engages the vertical arm of the depressed key-lever. This, of course, determines the distance the gear wheel may revolve. When pressure on the key-lever is removed, the spring 39 immediately returns the escapement to normal position. While this is taking place, and before the gears 20 and 27 are out of mesh, the spring 30 moves the pawl 34 into engagement with the gear wheel to hold the latter in its new position. This latter movement is practically simultaneous with the disengagement of the pawl 29. When the lower pawl 34 has been brought into engagement and the differen-

tial gear is out of mesh with the gear wheel, the spring 25 immediately returns the differential gear to its normal position ready for the next operation. Each key lever acts in the same manner and moves the same distance, but the movement of the differential gear varies according to the particular key lever operated, this being necessary to proportionately move the number rim to bring the respective numerals opposite the opening 73.

When the amount reaches "99," the cam 71 of the gear wheel contacts with the offset end of the L-shaped pawl 68 and depresses the arm 66 to set the tooth to engage one of the teeth of the ratchet wheel 61, the pawl 70 holding the ratchet against backward movement. Upon the next operation of a key lever, cam 71 frees the end of pawl 68 and the spring 67 draws the arm 66 and the pawl 68 upwardly, advancing the "hundreds" wheel one step, thus bringing a numeral thereof opposite the opening 73 and in alignment with the numerals indicated on rim 40. During the adding operation the worm 50 is revolved and arm 54 is moved thereby until stop 51 engages lug 55 which limits the rotation of the operating shaft. When this occurs the motor must be rewound. In the rewinding, the rear edge of the cam 71 contacts with the upper end of pawl 68 and turns it on its pivot out of engagement with the ratchet 61, causing its lower end to strike the lower end of pawl 70 to disengage the latter from the ratchet 61, which, together with wheel 60, will then return to normal position under the influence of spring 63 which is connected to arm 62 carried by wheel 60.

A machine constructed as described is limited to adding comparatively small sums, but it is obvious that by enlarging or rearranging the parts larger figures may be added.

I claim as my invention:—

1. An adding machine comprising, in combination, a gear-wheel provided with consecutively-arranged numerals, a motor, escapement mechanism comprising a gear-pinion and a series of differential stops carried by said gear-pinion, and a series of key-levers having extensions for moving the escapement-mechanism to allow the gear-pinion to mesh with said gear-wheel, said extensions being designed to cooperate with said differential stops.

2. An adding machine comprising, in combination, a gear-wheel provided with consecutively-arranged numerals, a motor, holding means for said gear-wheel, escapement mechanism comprising a gear-pinion and a series of differential stops carried by said gear-pinion, a series of key-levers having extensions for moving the escapement mechanism to allow the gear-pinion to mesh

with said gear-wheel, said extensions being designed to cooperate with said differential stops, and means actuated by the movement of said stop-mechanism for releasing said holding means.

3. An adding machine comprising, in combination, a gear wheel provided with consecutively arranged numerals, a motor, a gear-pinion designed to mesh with said gear-wheel and normally out of engagement therewith, a series of differential stops carried by said gear-pinion, a movable support for said gear-pinion and stops, a series of key-levers having arms designed to move said support, said arms cooperating with said differential stops, and retaining pawls for engaging said gear-wheel.

4. An adding machine comprising, in combination, a gear-wheel provided with consecutively arranged numerals, a motor, a gear-pinion designed to mesh with said gear-wheel, a shaft for said gear-pinion, a spring for returning the gear-pinion to its normal position, a movable frame forming bearings for said shaft, said gear-pinion having a series of differential stops, a series of key-levers having arms designed to engage said frame, said arms cooperating with the stops of the gear pinion, and two spring-held retaining pawls for alternately engaging said gear-wheel.

5. An adding machine comprising, in combination, a gear-wheel provided with consecutively arranged numerals, a motor, a vertically disposed gear pinion designed to mesh with said gear wheel, a series of differential stops carried by said gear-pinion, a movable frame having two corresponding spaced-apart members forming bearings for said shaft, a cross bar connecting said members, a series of key-levers having arms designed to engage said cross bar to move said frame, said arms cooperating with said differential stops, and two spring-held retaining pawls for alternately engaging said gear-wheel.

6. An adding machine comprising, in combination, a gear-wheel provided with consecutively arranged numerals, a motor, two disks connected together and having stepped flanges forming differential stops, one of said disks having segmental teeth forming a gear-pinion for meshing with said gear-wheel, a spring acting on said shaft to return the disks to their normal positions, a movable frame supporting said shaft, and a series of key-levers having arms for engaging said frame for moving said gear-pinion into mesh with the gear-wheel, the ends of said arms forming stops for cooperating with said stepped flanges.

7. An adding machine comprising, in combination, a gear-wheel provided with consecutively arranged numerals, a motor, a gear-pinion designed to mesh with said gear-

wheel, a series of differential stops carried
 by said gear-pinion, a movable frame sup-
 porting said gear-pinion and stops, an arm
 pivoted concentrically to said frame for en-
 5 gaging the latter, a spring acting on said
 arm, a spring-held shaft supported by said
 frame and upon which said gear-pinion is
 mounted, a series of key-levers having arms
 for moving said frame against the action of
 10 said spring, said arms cooperating with said
 differential stops, a spring-held pawl carried
 by said frame for engaging said gear-wheel,
 a second spring-held pawl mounted concen-
 15 trically to said frame for also engaging said
 gear wheel, and an arm carried by said last
 mentioned pawl designed to be engaged by
 said frame to free such pawl from the gear-
 wheel when the gear-pinion is moved into
 mesh with the gear wheel.

20 8. An adding machine comprising, in com-
 bination, a vertically-disposed gear wheel
 provided with consecutively arranged num-
 erals, a shaft for said wheel, a motor act-
 ing on said shaft to turn the wheel in one
 25 direction, a worm on said shaft having a
 stop at one end, a pivoted arm having a pin
 fitting in said worm and a laterally-extend-
 ing lug for engaging said stop to limit the
 turning of the shaft in one direction, and
 30 means on said shaft for winding the motor.

9. An adding machine comprising, in com-
 bination, a vertically-disposed gear wheel
 provided with consecutively arranged num-
 35 erals, a shaft for said wheel, a motor act-
 ing on said shaft to turn the wheel in one
 direction, a worm on said shaft having stops
 at the opposite ends thereof, a pivoted arm
 having a pin fitting in said worm and de-
 signed to engage the stop at one end thereof,
 40 said arm also having a laterally-extending
 lug for engaging the stop at the other end of

the worm, and means on said shaft for wind-
ing the motor.

10. An adding machine having a main
 wheel provided with a series of consecutively
 45 arranged numerals, a second numeral carry-
 ing wheel mounted adjacent to the first men-
 tioned wheel, a spring acting on said second
 wheel to move it in one direction, a ratchet
 carried by said second wheel, a pawl engag-
 50 ing said ratchet, a pivoted support for said
 pawl, a spring acting on said support, and
 a cam or projection carried by said main
 wheel for engaging said pawl to depress its
 support, said spring, when the pawl is freed
 55 of said cam or projection, causing the pawl
 through its action on the ratchet to turn said
 second wheel.

11. An adding machine having a main
 wheel provided with a series of consecutively
 60 arranged numerals, a second numeral carry-
 ing wheel mounted adjacent to the first men-
 tioned wheel, a spring acting on said second
 wheel to move it in one direction, a ratchet
 carried by said second wheel, a pawl engag-
 65 ing said ratchet, a pivoted support for said
 pawl, a spring acting on said support, a cam
 or projection carried by said main wheel for
 engaging said pawl to depress its support,
 and a second pawl engaging said ratchet
 70 wheel, the first mentioned pawl having a
 projection for disengaging the second pawl
 from the ratchet wheel when the first men-
 tioned pawl is moved relatively to its sup-
 port. 75

In testimony whereof, I have signed this
specification in the presence of two subscrib-
ing witnesses.

PERLEY E. REESE.

Witnesses:

FRANK G. WILCOX,
LEWIS A. ROBERTSON.