J. R. MONROE.

CALCULATING MACHINE.

APPLICATION FILED AUG. 3, 1914.

1,306,606.

Patented June 10, 1919.

4 SHEETS—SHEET 1.

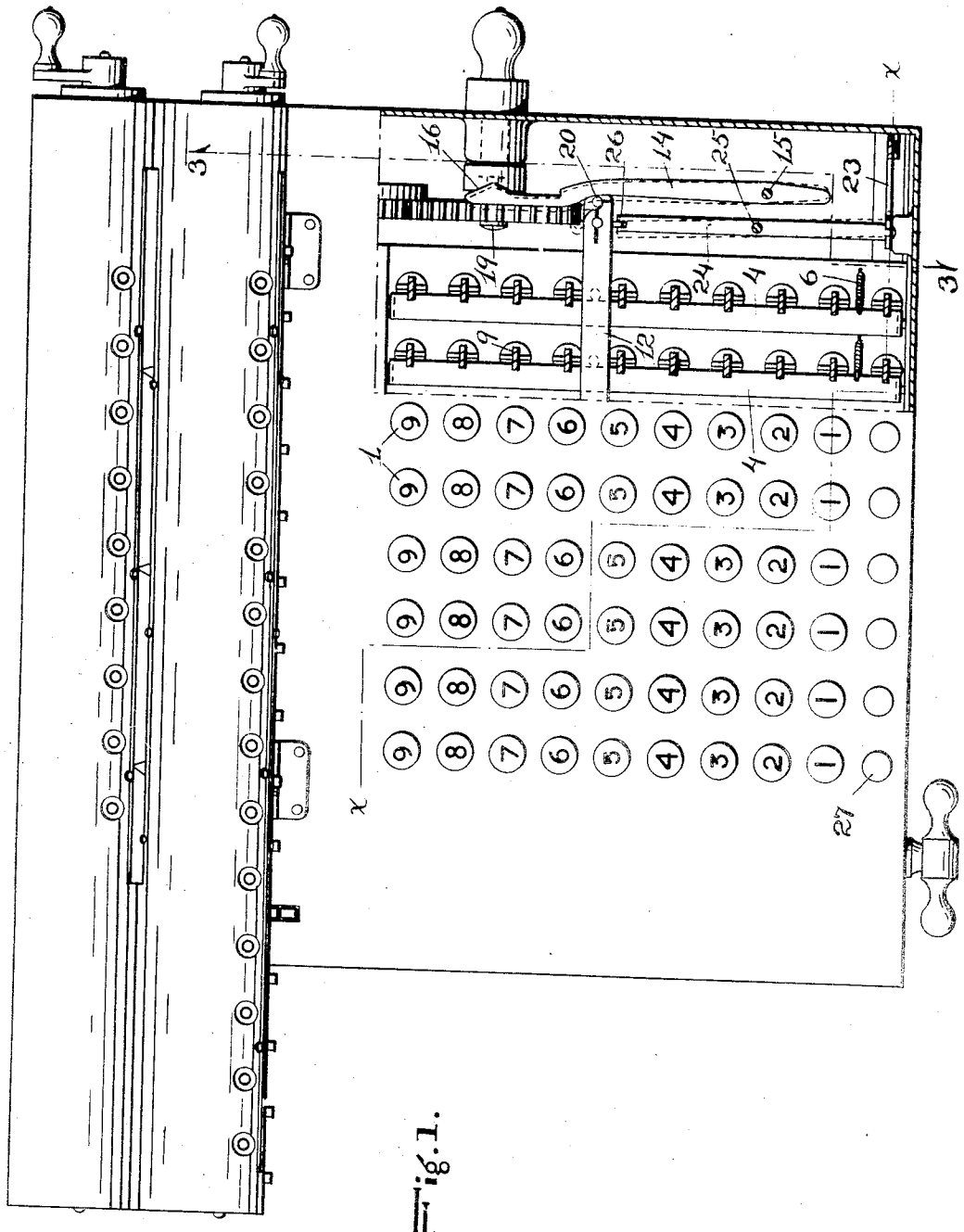


Fig. 1.

Witnesses

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4 SHEETS—SHEET 2.

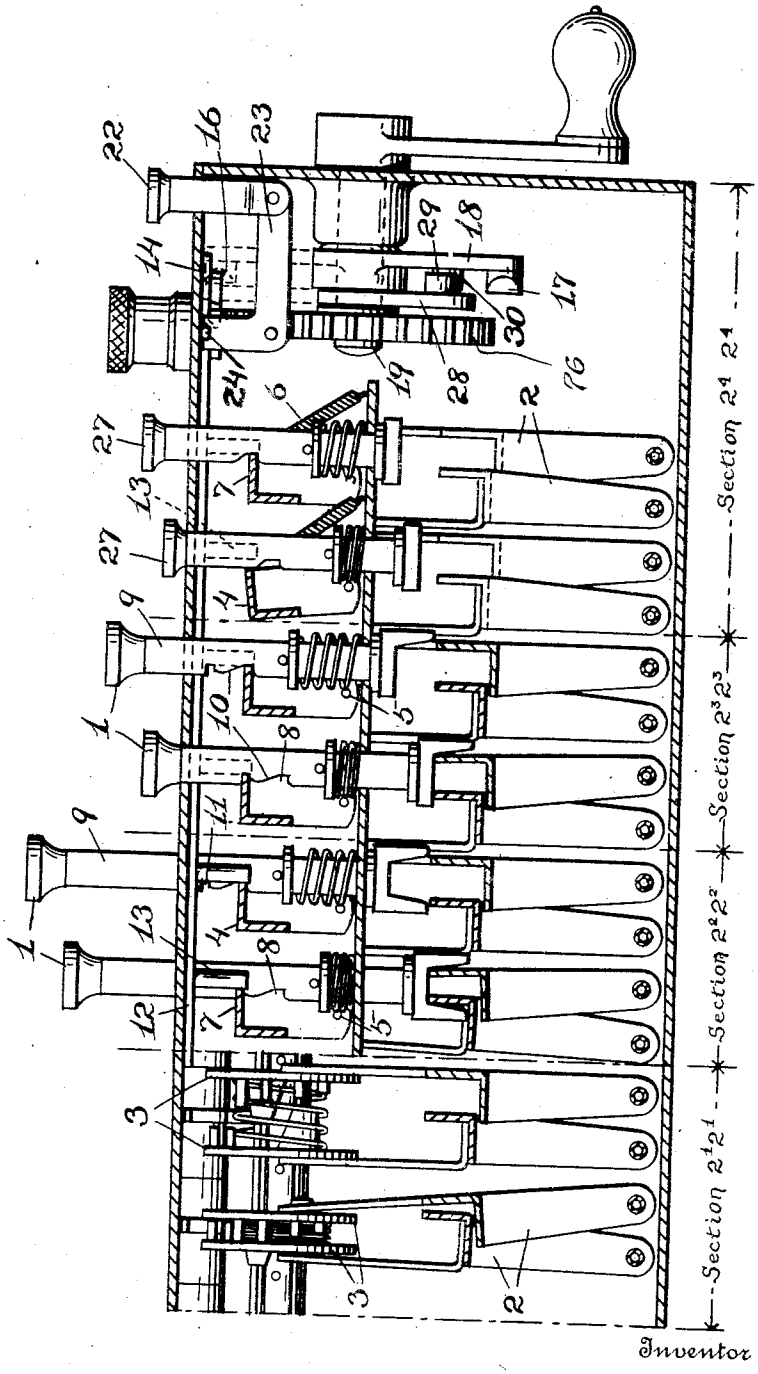


Fig. 2.

Witnesses

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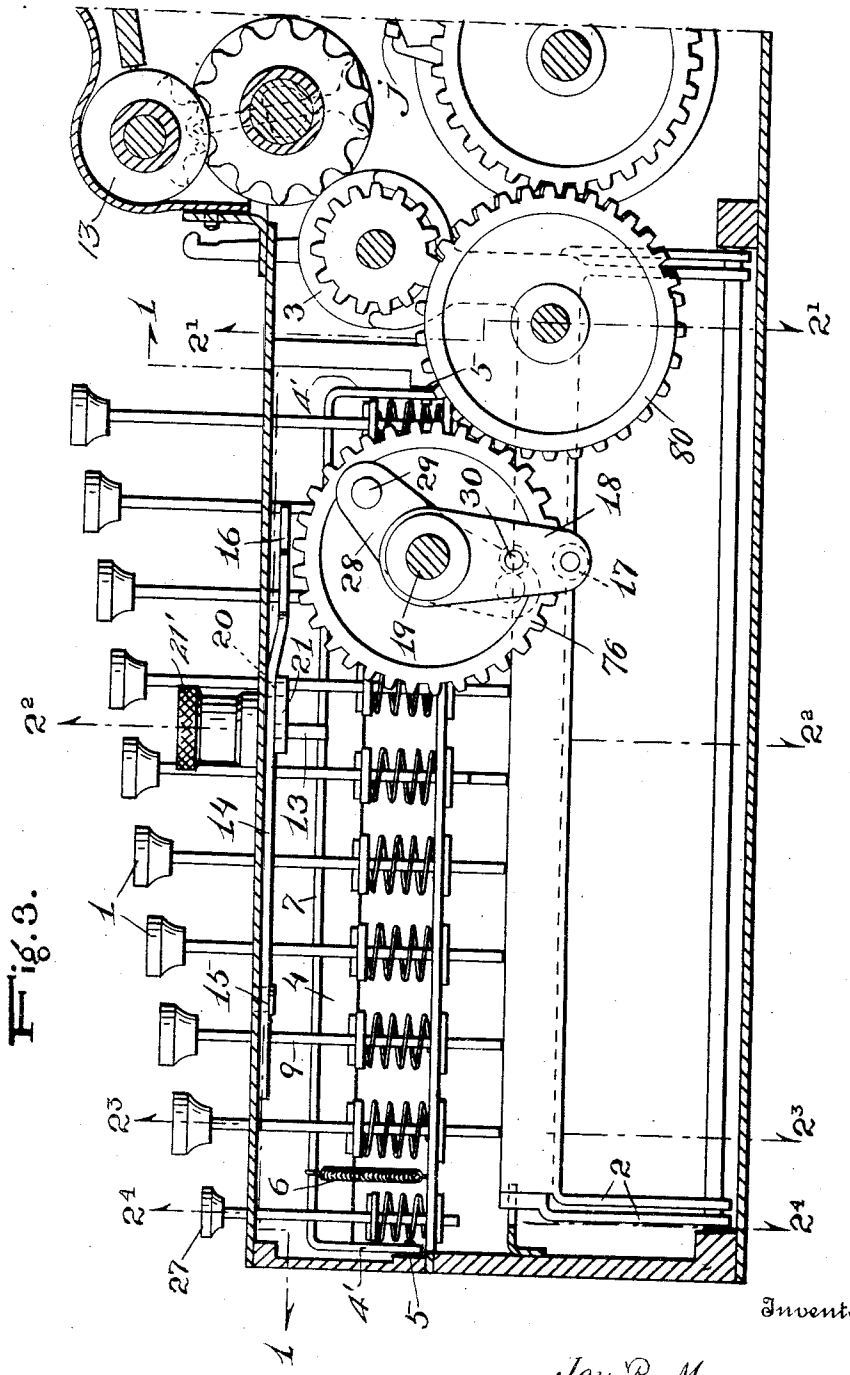


Fig. 3.

Witnesses

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4 SHEETS—SHEET 4.

Fig. 9.

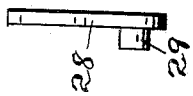


Fig. 8.

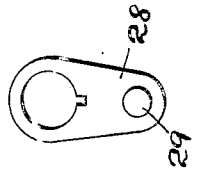


Fig. 7.

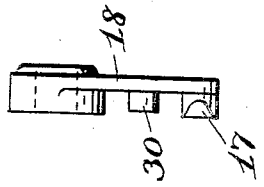


Fig. 6.

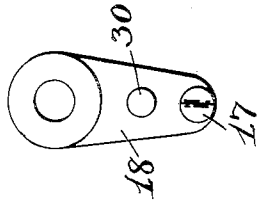


Fig. 5.

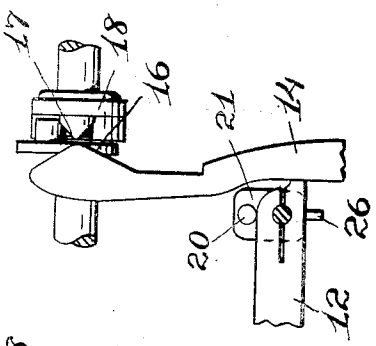


Fig. 4.

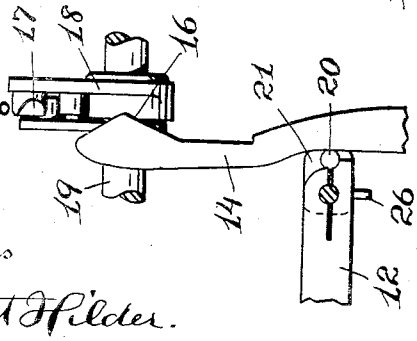


Fig. 12.

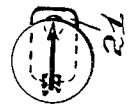


Fig. 13.

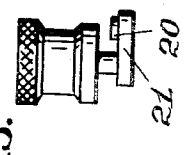


Fig. 10.

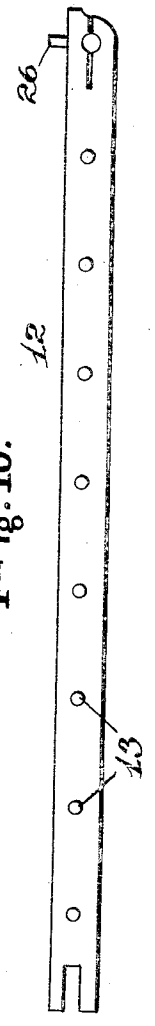


Fig. 11.



Witnesses

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UNITED STATES PATENT OFFICE.

JAY R. MONROE, OF NEW YORK, N. Y., ASSIGNOR TO MONROE CALCULATING MACHINE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

CALCULATING-MACHINE.

1,306,606. Specification of Letters Patent. Patented June 10, 1919.

Application filed August 3, 1914. Serial No. 854,687.

To all whom it may concern:

Be it known that I, JAY R. MONROE, a citizen of the United States, resident of New York, in the county of New York and State of New York, have made a certain new and useful Invention in Calculating-Machines; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the invention, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 is a plan view of a calculating machine, partly broken away, showing the invention in section on the line 1—1, Fig. 3.

Fig. 2 is a composite sectional view on the lines 2′—2′, 2^2—2^2, 2^3—2^3, 2^4—2^4, Fig. 3. The line of section is indicated at *x*—*x*, Fig. 1.

Fig. 3 is a section on the line 3—3, Fig. 1.

Fig. 4 is a detail plan view, partly broken away, of the lever for operating the rock bars to release depressed keys, and the means for actuating said lever, the pivotal end of the slide being in operative position.

Fig. 5 is a similar view, with the pivoted end of the slide turned to inoperative position and the cam 17 shown as opposite the cam end of the lever.

Fig. 6 is a detail end view of the crank arm of the operating shaft.

Fig. 7 is a detail side view of the same.

Fig. 8 is a detail end view of the second crank arm of the operating shaft.

Fig. 9 is a detail side view of the same.

Fig. 10 is a detail plan view of the slide, with the cam end thereof in inoperative position.

Fig. 11 is a detail side view of the slide.

Fig. 12 is a detail plan view of the pivoted end of the slide and of the turn button to move the slide into and out of operative position.

Fig. 13 is a detail side view of the same.

The invention has relation to calculating machines, and particularly to the keyboard thereof, having for its object the provision of improved means for releasing and returning to normal position all keys depressed.

Other objects and advantages will hereinafter appear.

In the accompanying drawings, illustrating the invention, the numeral 1 designates the numeral keys of the machine, operating rocking members 2, to move differential actuating or primary calculating wheels 3, the latter operated for the performance of arithmetical problems all as described at length in the patent to Baldwin, dated December 2, 1913, Number 1,080,245.

The members of each denominational series of keys are provided with a rock bar 4, common to all members of the series, said bar having preferably depending end arms 4′, pivoted at their lower ends at 5, the bar being operated by a spring 6 and having a top 7 engaged normally at one edge thereof with notches 8 of the key stems 9, said notches having each a beveled upper wall 10, which in the depression of the key will act to rock the bar, whereby, when the key reaches the limit of its depression, the bar will be engaged, through the medium of its spring, with an upper notch 11 of the key stem, to hold the key in depressed position.

Means are provided to rock all of the bars 4 and release all of the depressed keys of the different denominational series, upon rotation or turning of the operating crank handle of the machine in registering, said means consisting usually of a slide 12, located above and at right angles to the bars 4 and having depending pins 13, engaging the tops of said bars, a horizontal lever 14 at one end of the machine being pivoted at one end at 15 and having an opposite cam end 16, engaged by a cam 17 of a crank arm 18 of the operating shaft 19, in the turning of said shaft by its handle, said lever having intermediately of its length contact with a pin 20, located at the end of said slide, to move the slide endwise and release all of said bars and thereby release all depressed keys, which are returned to normal position by their springs.

Means are provided whereby the operating shaft may be turned without moving said slide and releasing the keys, consisting preferably of a pivotal end 21 of the slide, said pivotal end carrying the pin 20 and being adapted to be turned to one side upon its pivot, out of the way of said lever in the operation thereof by the shaft 19. An operating knob 21′, upon its pivot pin and projecting without the casing of the machine, controls the position of this pivotal end.

Means are provided for the operation of

the slide and release of all depressed keys at any time desired, independently of the turning of the shaft 19, and consisting usually of a depressible key 22, operating a bell-crank lever 23, said lever having engagement with the end of a lever 24, pivoted intermediately of its length at 25, the opposite end of said lever having contact with a pin 26 of said slide to shift the slide endwise upon depression of the key.

A separate key 27 is provided for each rocking bar or member 4, to operate the same when desired and release a depressed key of any denominational line.

As illustrated in Figs. 2 and 3 and described at length in the beforementioned patent to Baldwin, the operating shaft 19 carries a gear 76, forming part of an operating train for the primary wheels 3 and for carrying members *j*, said primary wheels constituting the connecting elements in a direct train of gear connections from the operating shaft to the numeral wheels 13. Reversal of the direction of rotation of the operating handle will thus cause reverse movement of the wheels 13, such wheels being operated in one direction in the solution of problems in addition and multiplication, and in a reverse direction in subtraction and division.

The operating train includes a mutilated gear 80, designed to allow in each rotation an idle or inoperative half-turn of the operating handle with relation to the primary calculating wheels. In forward rotation of the handle this half-turn, being the latter half of each rotation, brings carrying members *j* into operative relation with the intermediate gears, as fully described in the patent to Baldwin hereinbefore referred to. Obviously, from the starting position illustrated, movement of the handle in one direction will immediately communicate movement to gears 3, while reverse movement of the handle will be idle with respect thereto and to the carrying operation upon the intermediate gears during the first half-turn, after which the sequence of operations during repeated rotations is the same as in forward movement.

To meet these conditions of operation the crank arm 18 of the operating shaft is loose upon the arm 18, and connection is made to turn the shaft through the medium of a second crank arm 28, fast upon the shaft and having a pin 29 engaging a pin 30 of the arm 18. Owing to this arrangement, the pin 29 will not push the pin 30 and arm 18 past the point of contact with cam 16 at the beginning of any rotation, forward or reverse. Thus the operating shaft is allowed to turn in one direction a three-fourths turn, or 270 degrees from the starting position illustrated in Fig. 3, before operating the lever to move the slide, and in the other direction to turn 450 degrees, or a turn and a quarter, before operation of the lever and slide, it being designed that the slide shall not be operated until the primary wheels have been set up and the intermediate gears turned thereby.

What I claim is:—

1. In a calculating machine, spring retracted numeral keys, means for retaining said keys in depressed position, selecting elements movable to set up position upon depression of said keys, registering mechanism, means for actuating said registering mechanism in one direction for one problem and in a reverse direction for another problem including an operating device movable from normal position in either of two directions, and means coöperating with said operating device and capable of moving said retaining means to release said keys only after the actuation of said registering mechanism in the movement of said device from normal position in either direction.

2. In a calculatng machine, spring retracted numeral keys, means for retaining said keys in depressed position, selecting elements movable to set up position upon depression of said keys, registering mechanism, means for actuating said registering mechanism in one direction for one problem and in a reverse direction for another problem including an operating device movable from normal position in either of two directions, and means coöperating with said operating device and capable of moving said retaining means to release said keys only after the actuation of said registering mechanism in the movement of said device from normal position in either direction, and including a member capable of being set to key-release or non key-release position prior to the operation of said device.

3. In a calculating machine, spring retracted numeral keys, means for retaining said keys in depressed position, selecting elements movable to set up position upon depression of said keys, registering mechanism, means for actuating said registering mechanism in one direction for one problem and in a reverse direction for another problem, including an operating shaft rotatable from normal position in either direction, and means coöperating with said operating shaft and capable of moving said retaining means to release said keys only after the actuation of said registering mechanism in the movement of said shaft from normal position in either direction, and including a crank fast upon said shaft and having a pin, a crank loose upon said shaft and having a pin engaged by the pin of the fast crank, and a lever having a double cam portion engaged by said loose crank.

4. In a calculating machine, spring retracted numeral keys, means for retaining

said keys in depressed position, selecting elements movable to set up position upon depression of said keys, registering mechanism, means for actuating said registering mechanism in one direction for one problem and in a reverse direction for another problem, including an operating device rotatable in either direction and having upon reversal a limited inoperative movement prior to its operative movement, and means coöperating with said operating device and capable of moving said retaining means to release said keys only upon operative movement of said device.

5. In a calculating machine, spring retracted numeral keys, means for retaining said keys in depressed position, selecting elements movable to set up position upon depression of said keys, registering mechanism, means for actuating said registering mechanism in one direction for one problem and in a reverse direction for another problem, including an operating device rotatable in either direction and having upon reversal a limited inoperative movement prior to its operative movement, and means coöperating with said operating device and capable of moving said retaining means to release said keys only upon operative movement of said device, and including a member capable of being set to key-release or non key-release position prior to the operation of said device.

6. In a calculating machine, spring retracted numeral keys, means for retaining said keys in depressed position, selecting elements movable to set up position upon depression of said keys, registering mechanism, means for actuating said registering mechanism in one direction for one problem and in a reverse direction for another problem, including an operating shaft rotatable in either direction and having upon reversal a limited inoperative movement prior to its operative movement, and means coöperating with said operating shaft and capable of moving said retaining means to release said keys only upon operative movement of said shaft, and including a crank fast upon said shaft and having a pin, a crank loose upon said shaft and having a pin engaged by the pin of the fast crank, and a lever having a double crank portion engaged by said loose crank.

In testimony whereof I affix my signature, in presence of two witnesses.

JAY R. MONROE.

Witnesses:
CHAS. M. CLOSE,
IRVING COYNE.